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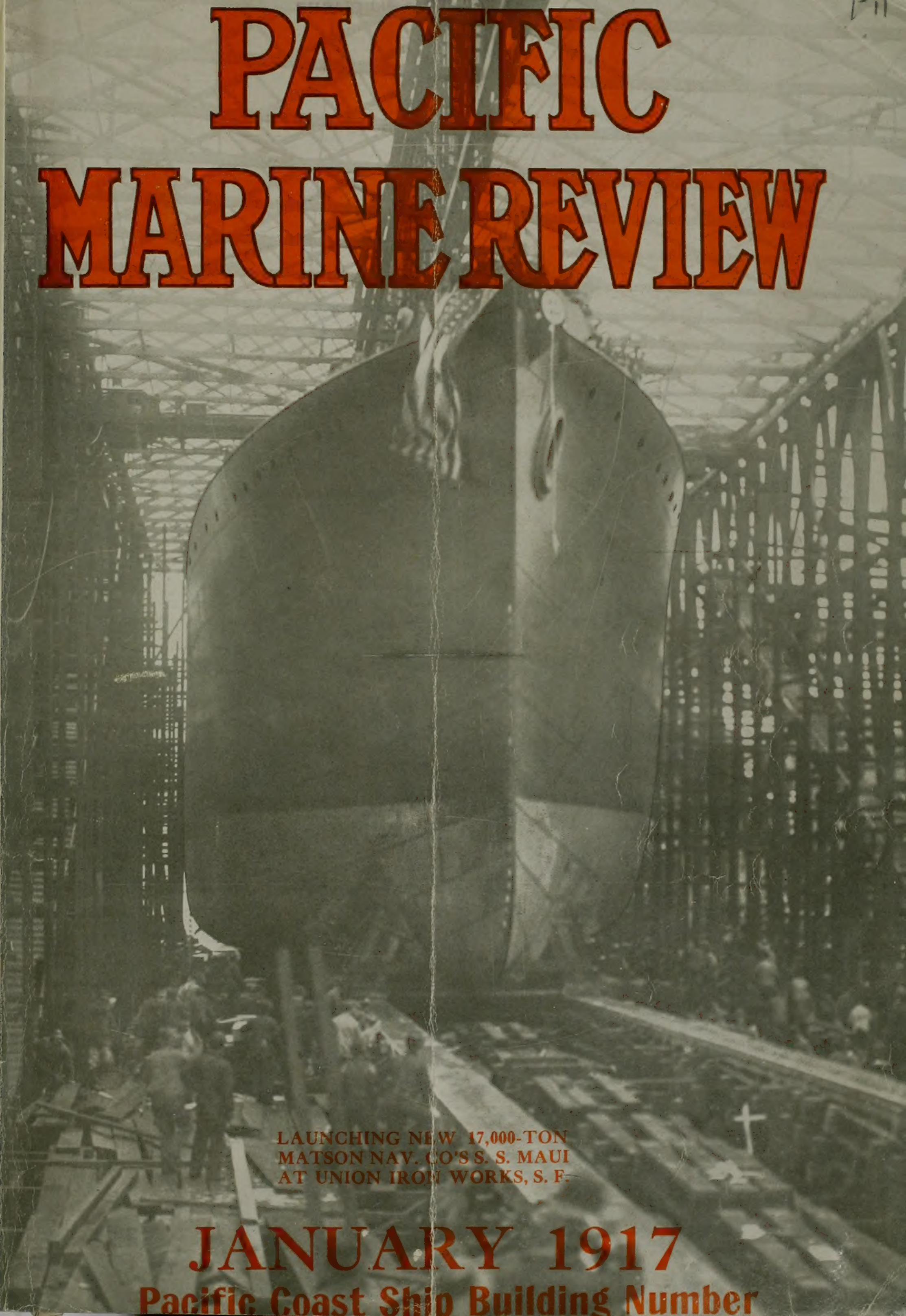
PACIFIC MARINE REVIEW



LAUNCHING NEW 17,000-TON
MATSON NAV. CO'S S. S. MAUI
AT UNION IRON WORKS, S. F.

JANUARY 1917

Pacific Coast Ship Building Number

analysis. Mine is to the effect that there is before us a prosperous period of at least five years in which we can improve our facilities and methods so much that there will be no question of our shipyard efficiency and ability to meet competition; provided that our Government and Shipping Board really reason together face to face with our shipowners, shipbuilders and shippers, and determine to adopt the best policy to advance that most necessary and beneficial feature of our industries, an American merchant marine. Let there be no more periods when our grain and produce cannot be delivered for want of American ships, or times when any foreign Government shall say what non-contraband can or cannot be shipped from our own ports.

"These facts are enough to fire your enthusiasm, but if you have listened with fair attention you have noted that there has been no indulgence in heroics. I trust, however, that you will have observed an underlying note of absolute faith in the future position and prosperity of our country, which must also carry with it the prosperity of those who build, own, operate and use our ships.

"I see no chance of failure in the future. We need men, but they will come from the warring nations, tired of their systems of government and rejoicing to become American citizens. Men, too, will be raised to find their opportunity in the steadily alive shipyards of the future.

"Our nation will again be a great maritime nation, holding its own among the other great nations of the earth."

At work on the double bottoms of two new steamers at the yards of the Seattle Construction and Dry Dock Company.

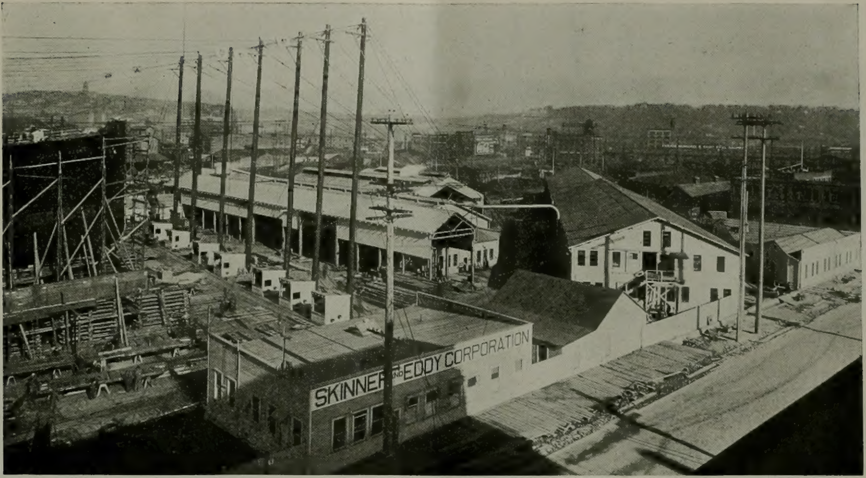
Shipbuilding in the Northwest

Shipbuilding in the Northwest as an industry has passed through the same vicissitudes as it has in the San Francisco Bay district. There are, of course, certain exceptions to this statement, such as the entry of the Columbia River region into large steel shipbuilding field, but on the whole the Coast, in common with all American shipbuilding sections, experienced a series of lean years when orders were few and far between.

The Northwest, like the rest of the sea-bordering sections of our nation, is now engaged in a great industry that has all the earmarks of permanency.

As far as steel shipbuilding is concerned, the Northwest for several years had but the one plant, that of the Moran Brothers, later the Seattle Construction and Dry Dock Company, just as the Union Iron Works was the only steel shipbuilding establishment south of the Columbia River.

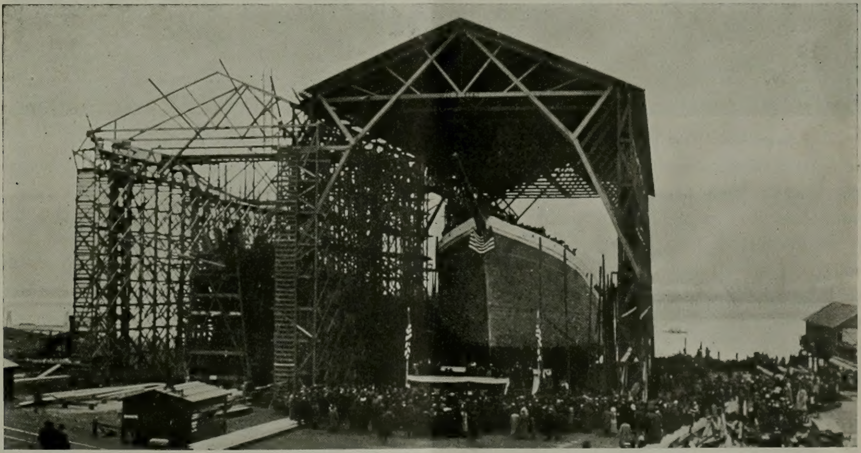
The new steel shipbuilding plants which have sprung into existence on this Coast over night as it were, probably owe a great deal more to these two pioneer firms than is commonly supposed. Steel shipbuilding at San Francisco was undertaken in the face of great difficulties and in spite of the well meant advice of the operators of Eastern yards who predicted financial disaster. When the Union Iron Works started and still later when Robert Moran opened his Seattle yard, it was practically necessary that a large plant secure a naval contract in order that a large force of mechanics might be kept employed and in readiness for work on repair jobs and the occasional merchant marine construction. In the early days of steel shipbuilding on both the Atlantic and Pacific Coasts, the first big government contract was what might be termed a "necessary evil." The struggles of the old Union Iron Works with the cruisers "Charleston" and "San Francisco" and the experiences of Robert Moran, in spite of the loyal support of the people of Seattle, when he was all but swamped on his battleship contract, illustrate the difficulties



General view of one end of the Skinner and Eddy plant, Seattle, showing main ship shed, mould loft and shop, also the trolley system used for handling material over the ship ways.

under which the pioneer firms in the steel shipbuilding line labored. Had they not weathered the storm it is doubtful if steel shipbuilding would have so readily been undertaken on this coast today.

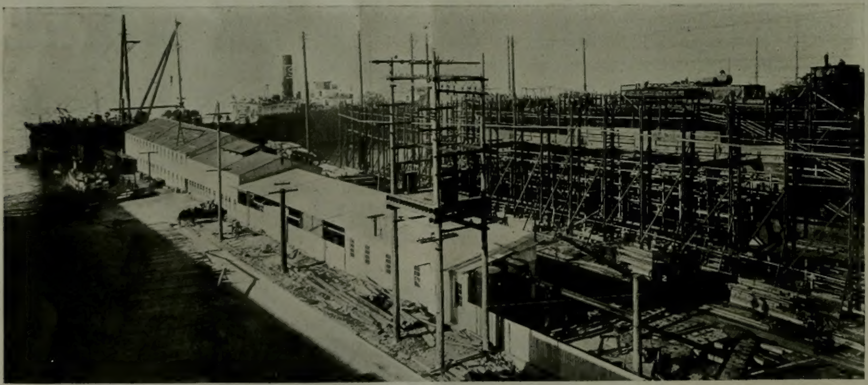
For the Puget Sound district the year 1916 has indeed proven an eventful one. The pioneer yard, the Seattle Construction and Dry Dock Company, had its building capacity rapidly filled up and the demand was so insistent for steel ships that other yards were expanded while new companies also entered the field. Skinner and Eddy accomplished the remarkable feat of erecting a yard and delivering their first big steel freighter within twelve months. This yard very quickly secured enough contracts to insure operation at full blast for two years to come. J. F. Duthie and Company, an old established firm which had confined its activities to the construction of small steel vessels, is expanding its yards in order to take care of the contracts for seven 8800-ton d. w. carriers; the Washington Shipbuilding Company, of Tacoma, Washington, has contracted for eight 8800-ton d. w. freighters; the Ames Shipbuilding and Dry Dock Company of Seattle, has orders for three 8800-ton d. w. freighters and is perfecting its yard organization preliminary to starting on these contracts; the new plant of the Anderson Steamboat Company, on Lake Washington, has two similar freighters on order; in other words while the close of 1915 found the Puget Sound district with one steel shipbuilding plant undertaking large steel hulls, the close of 1916 finds six establishments with big ocean steamers on order.



Peninsula Shipbuilding Company. Several of the Northwestern yards have adopted the ship shed in order that rainy weather will not unduly hamper the progress of the work.

General view of the shops at the Standifer-Clarkson shipyard. An extensive building program is keeping this firm running at full capacity.

On the Columbia River up to the opening of 1916 there had been no large steel ocean vessels built, but during the year just closed this district assumed an important place in American deep-sea steel shipbuilding. The Willamette Iron and Steel Works and the Northwest Steel Company have jointly accepted contracts for eight 8800-ton d. w. freighters, the Columbia River Shipbuilding Corporation have six similar craft on order and the Albina Engine and Machine Works are working on four 3800-ton freighters. All these firms are located in Portland.



Lower end of the Skinner and Eddy Corporation shipyard, showing water frontage and building slips.

In the matter of wooden shipbuilding the Northwest has always been pre-eminent but never in its history has it experienced anything like the present remarkable influx of orders for wooden hulls, many of which are of the auxiliary type, fitted with one of the several makes of heavy oil engines that have found favor on this Coast.

There are nineteen wooden shipyards that have been particularly busy during the past year in the Pacific Northwest. Kruse and Banks of North Bank, Oregon, have delivered during 1916 one steam schooner 225 by 42 by 16.6 molded, machinery being installed by the Main Street Iron Works, San Francisco, Babcock and Wilcox boilers; one steam schooner 235 by 42 by 17 molded, machinery the same as above. They are now working on two steam schooners the same as the first mentioned above and also a vessel 266 by 48 by 15 feet for the C. A. Smith Lumber Company. This latter vessel will be fitted with Scotch boilers and a turbine drive, an unusual type of drive for this class of vessel.

The Peninsula Shipbuilding Company of Portland, Oregon, have on hand two auxiliary schooners 251 and 257 feet in length by 43 feet 4 inches beam. These vessels will be twin screw with twin Winton Diesel engines of 600 b. h. p.

The Columbia Engineering Works of Portland, Oregon, has one auxiliary four-masted schooner, 170 by 36 by 14 feet to be launched during the present month, two schooners 180 by 36 by 14 feet on the ways, and four other schooners on order. These vessels will all be equipped with semi-Diesel engines.

The Standifer-Clarkson Company of North Portland, are building an auxiliary schooner 220 by 43 by 21 ft., with two 240 b. h. p. Skandia engines and two 50 h. p. Skandias for auxiliary machinery building for Libby, McNeil and Libby.

The St. Helens Shipbuilding Company at St. Helens, Oregon, which completed the big auxiliary "City of Portland" some time ago, now has three other large vessels under way.

The Wilson Brothers of Astoria, Oregon, launched a large steam schooner for the Chas. R. McCormick Company in November, 1916, and has another similar vessel well along towards completion.

The McEachern Company of Astoria, launched an auxiliary schooner 250 by 43 by 21½ feet in October, 1916, powered with two 240 b. h. p. Skandia engines, has six more schooners of the same size, type and power equipment on order and also two 266 foot auxiliary schooners to be powered with twin 320 b. h. p. Bolinder engines.

A comprehensive view of the Peninsula Shipbuilding Company's plant.

The Washington Shipping Corporation of Seattle, Washington, have six 250 by 43 by 21 foot auxiliary schooners under way for Norwegian interests. These vessels will be equipped with two 240 b. h. p. Mietz and Weiss oil engines.

The Alaska Pacific Navigation Company, Seattle, Washington, are building a freight and passenger motor ship 216 by 42 by 23 feet 7 inches, to be powered with two Southwark-Harris Diesel engines of 625 b. h. p. each. This vessel was launched in December.

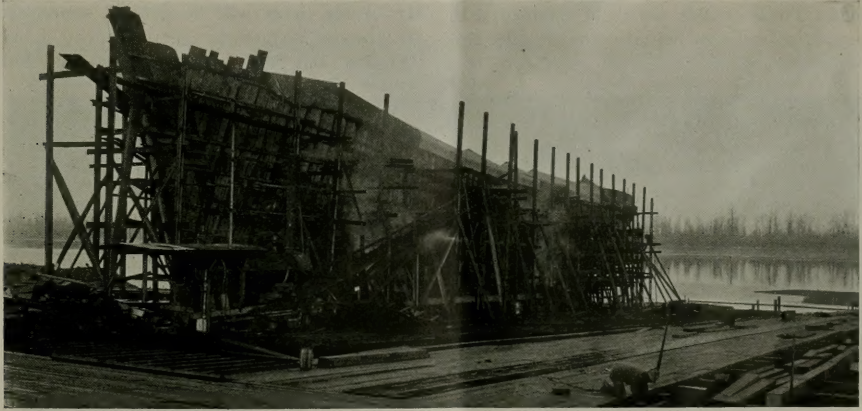
Babare Brothers of Tacoma, Washington, who recently completed an auxiliary schooner, now have on hand an order for 30 seine boats 65 by 15 by 6 feet 9 inches, each to have a 50 h. p. Standard Gas engine.

The Seaborn Shipbuilding Company of Tacoma, Washington, have two steam schooners, Almy watertube boilers and compound engines, one 237 and the other 170 feet long and one 250 foot auxiliary schooner to be equipped with twin 240 b. h. p. Skandia engines.

The Olympia Shipbuilding Company of Olympia, Washington, have two auxiliary schooners on order 268 by 48 by 26 feet 9 inches molded. These vessels will have heavy oil engines.

The Wallace Shipyards of North Vancouver, B. C., six auxiliary schooners 236 by 45 by 20 feet 10 inches, equipped with Bolinder engines.

The Geona-Cameron Mills Shipbuilding Co., Ltd.,


Ship No. 1 on the ways and ways prepared for a second vessel alongside at the Standifer-Clarkson yard, North Portland.

The "Cauto," a recently completed ship, laying at the fitting-out wharf of the Seattle Construction and Dry Dock Company.

of Victoria, B. C., three auxiliary schooners, heavy oil engines, 268 by 48 by 26 feet 9 inches.

The Winslow Marine Railway and Shipbuilding Company, Winslow, Washington, one 200 foot steamer, ore carrier, 1250 tons d. w. capacity, fitted with towing machine and will be used for towing ore barges.

Matthews Shipyard, Hoquiam, Washington, delivered during the year just closed the steam schooner Daisy Matthews, the auxiliary schooner Hartwood and the Motorship Sierra, fully described elsewhere in this issue. Under construction this company has two motor ships 225 by 42 by 15 feet, and one steam schooner.

The Pacific American Fisheries of Bellingham, Washington, are building two steamers of about 2,000 tons. These vessels are to be engined with triple expansion engines built by the Seattle Machine Works.

The Grays Harbor Shipyard, Aberdeen, Washington, have six five-masted auxiliary schooners on order, 290 by 48 by 24 feet dimensions, each to have 350 b. h. p. semi-Diesel engines.

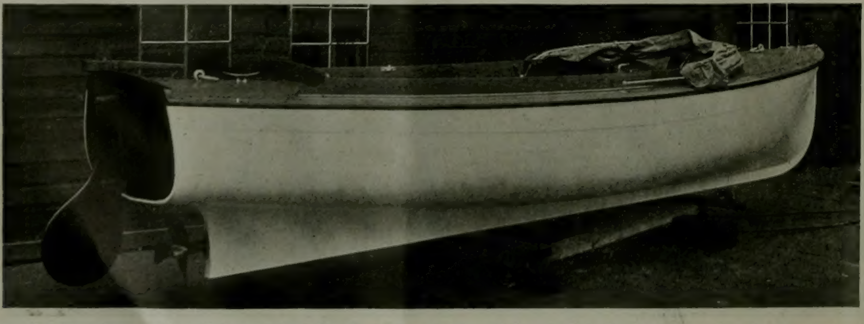
The Aberdeen Shipyard, Aberdeen, Washington, has to its credit the steam schooner "Oregon," 200 by 41 by 14 feet 8 inches; the auxiliary schooner "Columbia River," 251 by 42 feet 8 inches by 17 feet; the steam schooner "Idaho," 205 by 42 by 15 feet; the steam schooner "Phyllis," 215 by 42 by 16 feet 6 inches; one auxiliary schooner, Diesel engines, 290 by 49 by 24 feet and two motor ships, 225 by 43 by 16 feet.

ALBINA PLANT REINCORPORATED

An interesting development in shipbuilding circles during the past month was the incorporation of the Albina Engine and Marine Works. The officers of the reincorporated firm are William Cornfoot, head of the former Albina Engine & Machine Works, president and general manager; Arnold Reimann, who directs Andersen & Co.'s affairs in America, vice-president; Jesse Stearns, counsel for Andersen & Co., secretary, and J. J. Chambreau, auditor for that firm, treasurer of the shipbuilding organization. Emery Olmstead, vice-president of the Northwestern National Bank, and George J. Cameron, attorney for Mr. Cornfoot, are named as directors, together with Mr. Cornfoot, Mr. Reimann and Mr. Stearns.

The new corporation has initial orders for two 3300 and four 3800 ton d. w. freighters. Work on the plant site is progressing rapidly. The office and mold loft, a structure 80 by 200 feet, is already completed, and work on the main ship shed, which will be 500 by 85 feet in size, is started. Three building ways are being installed.

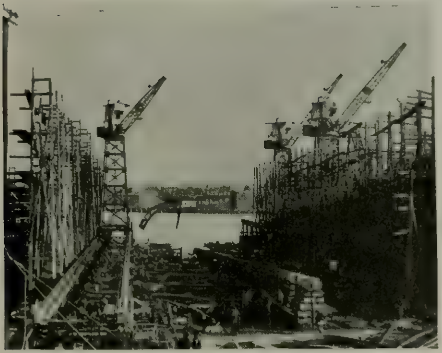
Mr. William Cornfoot, President of the corporation, is getting the yard organization well in hand. Mr. Brude Scott will be general superintendent; Mr. George Rodgers is superintendent of hull construction, and Mr. Robert Forster chief loftsman.



The Tregoning Boat Company is well known along the Coast as a producer of fine small craft. The illustration shows a tender for the steamer "Niels Nielsen" constructed by this enterprising firm.

Union Iron Works Power Equipment

By R. H. FENKHAUSEN



View of building berth showing tracks for electric tower cranes.

THE supply of power for the construction of merchant and naval ships is rather a complex problem, owing to the diversified processes involved in the various departments.

In order to give an idea of the number of different kinds of power required, the following list is given:

Compressed air, at 100 lbs. per square inch, for pneumatic tools, etc.

Hydraulic pressure, at 1500 lbs. per square inch, for flanging, etc.

Low pressure air, at 10 oz. per square inch, for oil burning forges.

Salt water, at 60 lbs. per square inch, for general service.

Electric power, at 480 volts, 3 ph., for general power service.

Electric power, at 230 volts, d. c., for machine shop service.

In addition to the above, many special voltages are required for electric welding, charging electric vehicle batteries, lighting, etc.

Compressed Air Equipment

The supply of compressed air for riveting hammers, air drills, etc., constitutes the heaviest demand on the power plant, and to supply this the Union Iron Works Company operate several compressor plants, having capacities as follows:

20th and Michigan Sts.	1800 h. p.
18th and Illionis Sts.	1075 h. p.
Alameda Branch	3000 h. p.
Hunter's Point Dry Dock	750 h. p.
Total	6625 h. p.

In addition to the above, several smaller compressor plants of a temporary nature are in operation, owing to the fact that all the permanent plants are not yet completed.

Hydraulic Pumping Equipment.

The hydraulic pressure for the operation of keel benders, flanging presses, etc., is furnished by triplex hydraulic plunger pumps, direct connected to motors.

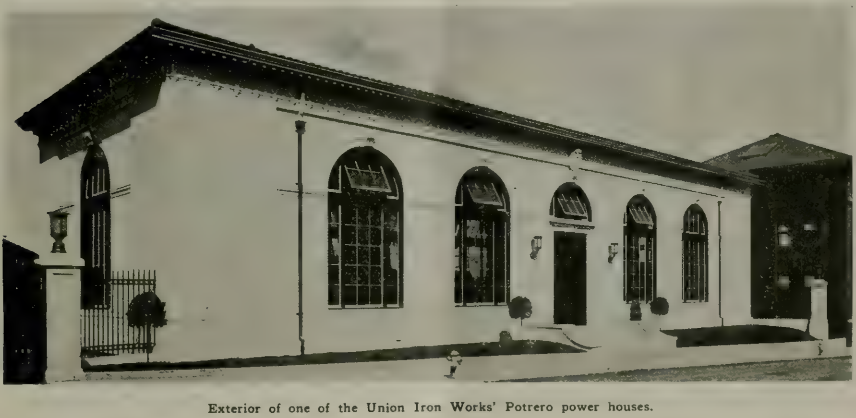
Storage capacity to take care of the varying demand on the system is furnished by a battery of accumulators. The motors are started and stopped automatically by limit switches at the upper and lower limits of travel of the accumulator.

Low Pressure Air Equipment

Low pressure air for the oil burners on forges, angle iron furnaces, etc., is not supplied from the central point, on account of the great loss in transmission. Direct connected blowers are located in each shop where low pressure air service is necessary, and in some cases individual blowers are used on each fire.

Salt Water Service

Salt water service at 60 lbs. to the square inch is necessary for cooling water in air compressor water jackets, yard sprinkling and sanitary service.



Exterior of one of the Union Iron Works' Potrero power houses.

Sketch of the power house erected by the Union Iron Works at their Alameda plant.

For fire protection, arrangements are provided to automatically raise the pressure to 120 lbs. to the square inch.

Electric Power

Electric power for machine tool service is furnished at 480 volts, 3-phase, 60 cycles, except in the case of the machine shop, where the necessity for variable speed control on most of the tools has made the use of 230 volt direct current advisable.

Lighting

All lighting, both indoor and outdoor, is by means of type "C" Mazda nitrogen filled lamps, operated at 120 volts, single phase, 60 cycles. Arc lighting was discontinued several years ago on account of the flickering and general unreliability of this form of lighting.

Yard Transportation

For moving material between shops, wharves, etc., two-ton G. V. electric trucks, specially built to the specifications of the Union Iron Works Company, are employed. The motive power of each truck is furnished by 42 cells of A-4 Edison battery, which gives sufficient capacity to run the truck for 24 hours with a freshening charge during the noon hour.

Source of Power

Power at all plants is obtained from the system of the Pacific Gas & Electric Company. 11,000 volts, 3-phase, 60 cycles, is delivered through underground cables and transformed to the various voltages required.

Distribution System

On account of the necessary head-room required by locomotive cranes, etc., moving around the yards, all electrical feeders are carried underground. Lead-covered cables in vitrified terra cotta ducts, with reinforced concrete manholes, is the standard construction employed in all plants of the company.

All cables are in duplicate and terminate in subdistribution centers located in the various departments.

The current supply to each department is separately metered at the sub-station switchboard.

Machine Tool Control

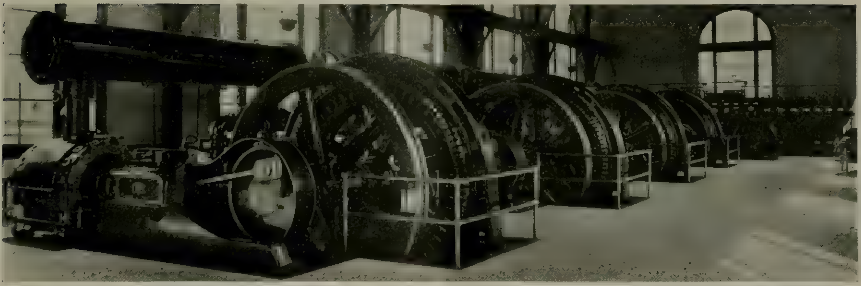
Each machine tool is individually driven by an electric motor, no line shafts whatever being employed. In order that the attention of the machine tool operator be not distracted from his work, as well as to protect the equipment from abuse, due to careless operation, automatic acceleration is being installed on all new machines.

To start a machine, it is merely necessary for the operator to press a button, which causes the machine to automatically come up to any speed for which it has been set. By pressing the stopping button, the current is shut off and the machine brought to an instantaneous stop by the automatic application of an electric brake.

Safety Protection

All electrical equipment is being laid out in cooperation with the engineers of the Industrial Ac-

Another view of the building berths at the Alameda plant showing the start on the construction of a large steamer.

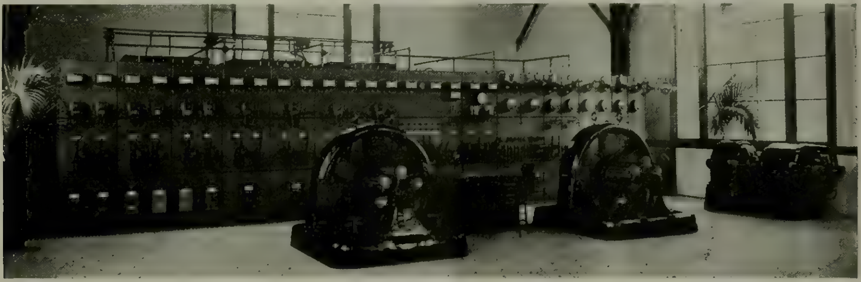


Interior of the Union Iron Works', Potrero plant, power house, showing four large compressor units.

cident Commission. All switches are totally enclosed and are so arranged that the opening of the switch automatically disconnects all current-carrying parts from the line, which makes the replacement of fuses, etc., absolutely safe.

Voltage protection is arranged in such a manner that should the current be interrupted and the machine tool brought to a stop, the restoration of the current will not cause the machine to start until the operator has pressed the starting button. This feature prevents accidental injury to a workman who thoughtlessly starts to make adjustments of his machine during a temporary interruption of the power supply.

All gearing, pulleys and other moving parts are protected by screens of angle iron and expanded metal.



Interior of the Union Iron Works Power House, showing the switchboard.

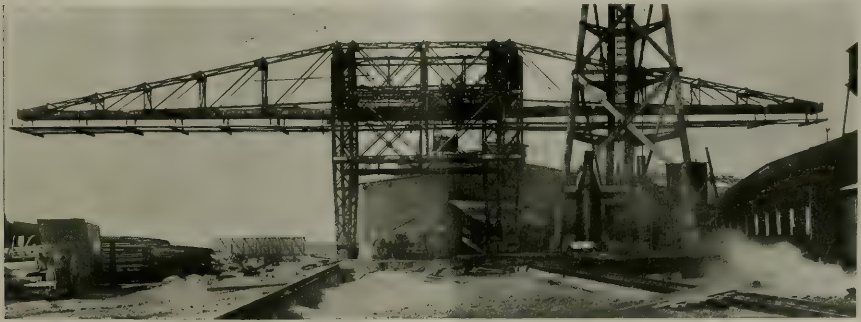
20th and Michigan Street Station

This station is a reinforced concrete building, 40′ x 126′, the lower floor of which is used as an electrical repair shop.

This station is the main power supply of the Potrero works, and contains four Chicago pneumatic air compressors of 2500 cubic feet capacity, each direct connected to a 450 h. p., 138½ r. p. m., synchronus motor, giving this station a total air capacity of 10,000 cubic feet of free air per minute.

Excitation for the compressor motors is furnished by a 75 k. w. exciter set, which also furnishes current for charging the storage batteries on the electric motor vehicles used in the yard.

Direct current for the variable speed motors in



The large gantry installed to handle material in the plate and shape storage space of the new Alameda branch of the Union Iron Works Company.

the machine shops is furnished by two 200 k. w. rotary converters.

The transformer equipment for this plant consists of three 750 k. v. a., 11,000 to 480 volt self-cooled, oil insulated transformers; two 200 k. v. a., 11,000 to 140 volt self-cooled, oil insulated transformers for the rotary converters; and three 75 k. v. a., 11,000 to 120 volt self-cooled oil insulated transformers for lighting service.

18th and Illinois Street Station

This station contains four belted compressor units as follows:

One 2500-cubic-feet Risdon compressor, belted to a 500 h. p. motor.

One 1500-cubic-feet Ingersoll-Rand compressor, belted to a 300 h. p. motor.

One 1200-cubic-feet Hall compressor, belted to a 200 h. p. motor.

One 400-cubic-feet Ingersoll-Sergeant compressor, with 75 h. p. motor.

The transformer equipment in this station consists of three 500 k. v. a., 11,000 to 480 volts, oil insulated, water-cooled units.

The equipment and general arrangement of this station is not up to the standard of the other U. I. W. power houses, its greatest point of interest being the fact that it was in operation and carrying full load just thirty days after the authorization for its construction had been made.

Alameda Plant Station

This station is now under construction and is a finished brick building with concrete trimmings. Window sashes are of metal and the building is fire-proof in every detail.

The compressor installation at this plant consists of four Chicago pneumatic air compressors of 2212 cubic feet capacity, each direct connected to a 375 h. p., 200 r. p. m., synchronus motor. Space is provided for four additional units of the same capacity, giving the Alameda plant an immediate capacity of 8848 cubic feet of free air per minute, and an ultimate capacity of double this amount.

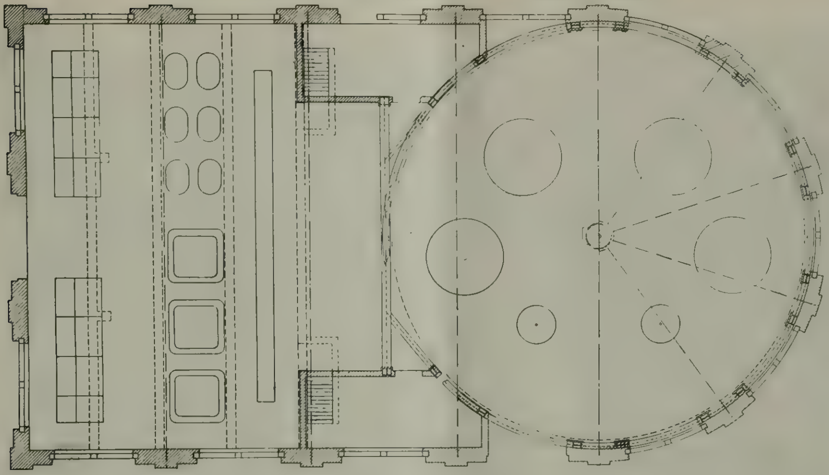
Direct current for the variable speed motors in the machine shop is furnished by two rotary converters, which are exact duplicates of those in the Potrero plant. Special arrangements are made, however, to carry the excitation load of the compressor motors from this source, doing away with the use of exciters.

General view of the Union Iron Works Company's Potrero plant. This gives a very good idea of the general arrangement of this shipyard

The transformer equipment for this plant will consist of six 500 k. v. a., 11,000 to 480 volt, oil insulated, self-cooled transformers, for compressors in general power service. The transformers for rotary converters and lighting will be duplicates of those in the Potrero station.

The principal difference between the Potrero and the Alameda stations lies in the fact that improvements in air compressor designs made since the completion of the Potrero station, have enabled a higher speed unit to be used, which has allowed placing almost double the compressor capacity in the same floor area.

The main switchboard is also somewhat differ-



PLAN VIEW.

Plan of transformer house and pump room for the great new dock now under course of construction for the Union Iron Works Company at Hunter's Point, San Francisco.

ent, on account of the great advances made in switchboard practice during the past few years.

New Hunter's Point Pumping Station

For unwatering the new mammoth graving dry dock at Hunter's Point, a new pumping station is under construction.

Four vertical centrifugal pumps, each direct connected to a 750 h. p., vertical induction motor, and two 100 h. p. units, of the same general type, constitute the pumping equipment of this plant.

In addition to this, the plant will contain transformers for the operation of capstans, traveling cranes, lighting and the operation of machine tools necessary for work going on at the dry docks.

The architectural features of the building will be rather unique in the respect that the switchboard will be built in the arc of a circle 24 feet in radius, and will thus form part of the wainscoting of the circular pump room.

The sub-station proper will be rectangular, giving the building a rectangular outline with one end in the shape of a semi-circle.

The pump motors will be operated at 2200 volts, 3-phase, 60 cycles, on account of the heavy currents encountered at the lower voltages. All other equipment, however, will operate at the voltages standardized in the other plants.

The transformer equipment for this plant will consist of three 500 k. v. a., and three 200 k. v. a., 11,000 to 2400 volt, oil insulated, self-cooled transformers for the main pumping units, and two smaller banks for the 480 volt power and 120 volt lighting service.

Floating Dry Dock Station

The new floating dry dock now under construction will be equipped with ten 50 h. p. centrifugal pumps, each direct connected to a vertical induction motor. This load, in addition to the two floating docks already at the plant, make the power demand too great to be carried from the main station.

In order to take care of this load, a special station will be constructed at the floating dry docks, and, in addition to the transformers for the dry dock load, will also contain the salt water pumping units furnishing the salt water service of the yard and lighting transformers for the ship lighting load. The marine distribution center for lighting and power, as well as the automatic control panels of the salt water pumps, will be located in this station.

Drawing of new plate shed now being finished at the Alameda plant of the Union Iron Works Company.

View in back of the switchboard, Union Iron Works' Potrero plant power house.

Launch of the "Maui"

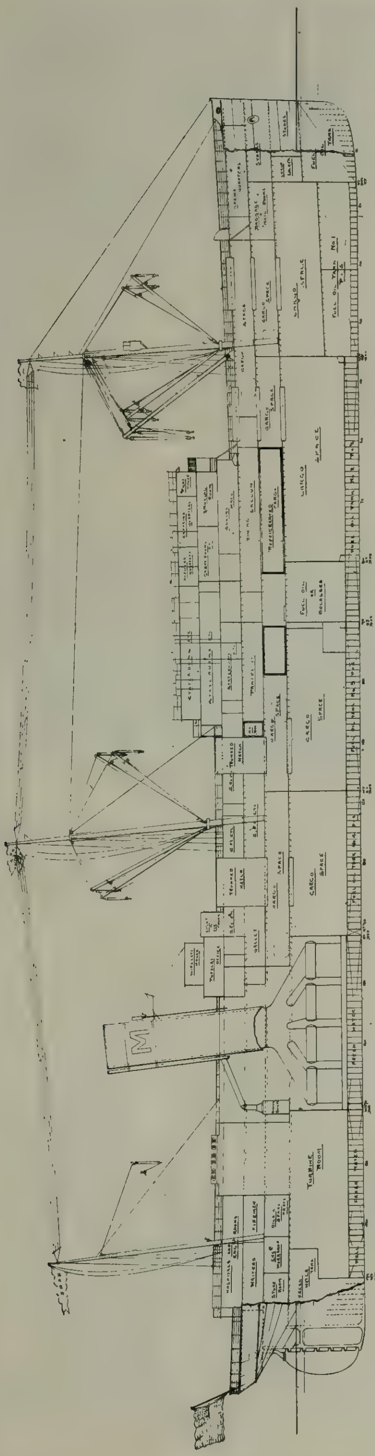
NO launching on the Pacific Coast during the year just closed held so much of general interest as that of the new liner for the Matson Navigation Company, which was released from the ways at the Potrero Works of the Union Iron Works Company on December 23rd.

Special interest attaches to the "Maui" for several reasons, among them being the following: She is the largest vessel intended for passenger and freight service launched in the United States during the year; she is one of the very few ocean going vessels built during the year for passenger service, the great majority of the sea-going vessels being tankers and freighters; she follows the usual Matson practice of having her machinery aft and will have a geared turbine drive.

The "Maui" is 501′ 2″ over all, 484′ between perpendiculars, 58′ molded beam and 44′ 9″ molded depth to shelter deck, the displacement at 30′ draft is 17,430 tons and the contract load speed is 16½ knots.

The vessel is constructed entirely of steel to the highest class in Lloyd's, and will have three complete steel decks with a promenade deck extending for fully two-thirds her length. She will be rigged as a three-masted schooner with steel pole masts and a complete equipment of heavy cargo booms with heavy tackle, capable of handling weights of fifty tons. The hold and lower 'tween decks forward of the machinery and boilers will be divided into four compartments and in addition there will be a deep tank between numbers two and three holds to the height of the lower deck, fitted for carrying molasses or other liquid cargo in bulk. Large hatches are arranged over each compartment, those leading to No. 3 and No. 4 holds being trunked through the passenger accommodations. There are four cargo ports on each side between the main and upper decks, these being 9′ by 6½′ in the clear. Wing hatches are fitted in the 'tween decks to facilitate feeding cargo to the lower holds. Two Murray type winches are fitted at each hatch for the direct handling of cargo.

The hull of the "Maui" is constructed on the transverse system, with eight watertight bulkheads and a double bottom 5′ 6″ deep extending the full length between fore and after peaks. The inner bottom under No. 1 hold has been raised to the height of the orlop deck forming a large deep tank for the carriage of fuel oil, and the double bottom under the turbine and boiler rooms has been increased to 6′ in depth. The double bottoms under the machinery spaces are utilized for fresh water, the remainder of the compartments and the fore peak for fuel oil, while the after peak carries fresh water. As will be noted on the sketch plan herewith, large refrigerating compartments are provided for in upper 'tween decks.



Inboard profile of the Matson Navigation Company's new steamer "Maui," which was launched at the Union Iron Works on December 23rd.

The propelling machinery will consist of twin sets of cross-compound Westinghouse Parsons geared turbines of the single reduction type of 5000 shaft horse-power to each unit. The reduction gear will be of the latest Westinghouse type, consisting of helical gears with right and left-hand tooth faces, and in order to secure accurate alignment the pinions are to be carried in bearings in floating frames of the Westinghouse type. The thrust bearings are of the Kingsbury segmental type, enclosed in oiltight casings.

The condensate pumps are of the turbine driven navy horizontal type located under the condensers.

Air ejectors of the Westinghouse Le Blanc type will be installed as substitutes for vacuum pumps, and will be designed to produce a vacuum of 28½" with barometric pressure of 30".

The circulating pumps will be of the Westinghouse centrifugal volute multi-stage type, driven by Westinghouse steam-geared turbines.

The condensers are of circular form, having steel bodies and cast iron heads, with ample cooling surface for operating at full power with vacuum of 28½" and sea water at temperature of 75 deg. F.

The main shafting is 10% in excess of Lloyds' requirements and the propellers are of the built-up type, each having three manganese bronze blades and cast iron hub, and will turn up to 120 revolutions under full power. Steam will be generated in eight Babcock and Wilcox watertube boilers of a total heating surface of 30,100 square feet, and fitted with superheating arrangements of a total of 3520 square feet of surface. They are built for a working pressure of 250 pounds per square inch and fired thwartships under natural draft by fuel oil atomized mechanically.

The molasses pump will be of the horizontal, ball valve type, the steering gear of the Brown steam tiller type, with telemotor control and the electric plant consists of two 30 k. w. and one 50 k. w. engine driven direct connected generators. The refrigerating plant will consist of duplicate 10-ton plants, of the brine circulating type.

Powerful wireless installation will be fitted, also submarine fog signal equipment.

Life-boat accommodations will be provided for all on board by means of nine metallic doube-ended boats and one wooden power life-boat for towing the balance, all stowed under Welin patent davits.

The passenger accommodations on the "Maui" will follow closely those on the "Matsonia," there being, however, a larger number of special staterooms on the new ship. The house on the flying bridge contains the captain's stateroom and office, accommodations for the deck officers, four special large staterooms with baths attached and eight single berth bachelor rooms. Immediately below the flying bridge house is the boat deck house, the forward end of which is occupied by the smoking room, aft of which is a group of special rooms with baths.

On the shelter deck there are five deck houses, extending forward as far as the boat deck. The foremost of these deck houses contains the large social hall, ladies' lounge, writing room and a wide entrance lobby through which access is had to the dining room below. A group of special rooms and baths occupies the after end of this structure. The next two houses consist of staterooms grouped around the hatch casings leading to numbers 3 and 4 holds, the rooms either having private baths or being grouped so that a bath is immediately adjacent. The fourth house on this deck is built round the boiler hatch casing and is occupied by state rooms, barber shop, etc. The after house is occupied by quarters for the chief engineer, office, hospital, wireless house, etc.

On the upper deck right forward is the forecastle, with roomy accommodations for the sailors. Aft of the forecastle is an upper 'tween deck space specially suitable for carrying tropical fruits. Aft of this 'tween deck space and occupying the full width of the ship for eighty feet is the dining saloon, arranged to seat 256, or the full passenger list at one sitting. Aft of the dining room on the center line of the ship is the first class pantry, which is connected by a separate passageway to the galley. On each side in the way of the pantry and hatch casings to No. 3 and No. 4 holds, is a double bank of state rooms, and the lavatories for men and women. Aft of these is the main galley, extending right across the ship. Aft of the galley is a thwartship passage through which all galley supplies can be brought on board. From here on aft this deck is occupied by accommodations for third class passengers and the engine room and steward's crews.

The full first class list will number 252, there being 64 3-berth rooms, 24 2-berth rooms, and 12 single-berth rooms. Portable electric heaters will be used lavishly for heating purposes in the first class quarters. ,

The "Maui" is being fitted as an auxiliary cruiser of the second class under the Postal Subsidy Act of 1891, and will have foundations for the carriage of four six-inch guns.

At the launching of the "Maui" on December 23rd, Mrs. William Matson acted as sponsor, and the vessel was christened in the presence of a large and distinguished gathering of guests.

The Northwest Steel Company

THIS plant covers a ground area of approximately 20 acres and is located in Portland, on the Willamette River.

There are four building ways, capable of taking care of ships up to 525 feet in length. On the slips, placing of material is handled by means of an aerial tramway system, operated by electrically propelled winches, which are housed over and placed on wooden towers about 75 feet in height, thus affording the operator an unobstructed view at all times of the ways he serves. The mold loft is a single story, frame structure, 208 feet long by 80 feet in width, with a clear span of 60 feet, and is heated by a modern hot air installation.

Bow view of Ship No. 1, now well under way at the yards of the Northwest Steel Company, Portland, Oregon.

Shops and Yards

The main shop, which is approximately 60' x 730', the plate shop, 60' x 480', and beam shop, 50' x 300', are fitted with full complement of up-to-date tools, equipment and handling facilities. In these shops are installed punches, large radial drills, counter sinking drills, rolls for large and small plates, bull dozers, plate planers of various capacities, automatic bull riveters, etc. The blacksmith shop is 50' x 110', in which are installed air hammers, air and oil forges, and the usual quota of large and small blacksmith tools.

Rivets, upset rods and bolts are manufactured in a shop 50' x 110', fully equipped with heading, cutting and threading machines of the latest type, the rivet making capacity alone being about 800 tons per month. The machine shop is 50' x 100', in which are installed high speed lathes, planers, shapers, etc.

The output of these shops when run to capacity is about 5000 tons of fabricated material per month.

In the power house and compressor plant there are installed six 1300 feet current driven air com-

Heavy ship shed tools at work in the plant of the Northwest Steel Company.

pressors, of latest model and design. Air lines lead from this centrally located plant to all parts of the ways and various shops.

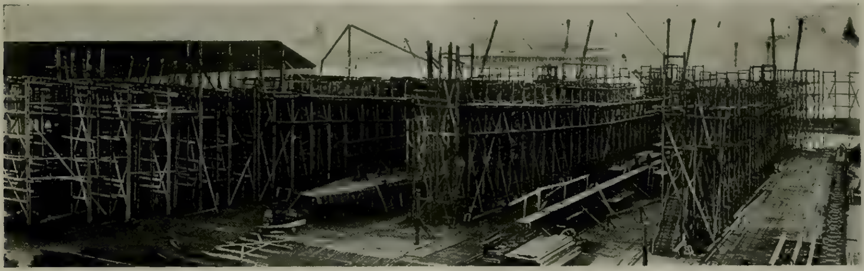
In the material yards, one of which is 70′ x 400′, and another 120′ x 800′, are installed plate shears, angle shears, high and low speed friction saws, manglers, milling machines, etc. There is also a material dock, 100′ x 400′, which serves a twofold purpose, being used as reserve storage space for certain plates and shapes, thus obviating possibility of congestion in the yards, besides rendering the plant not entirely dependend upon rail lines for the shipment of various commodities consumed.

Handling System

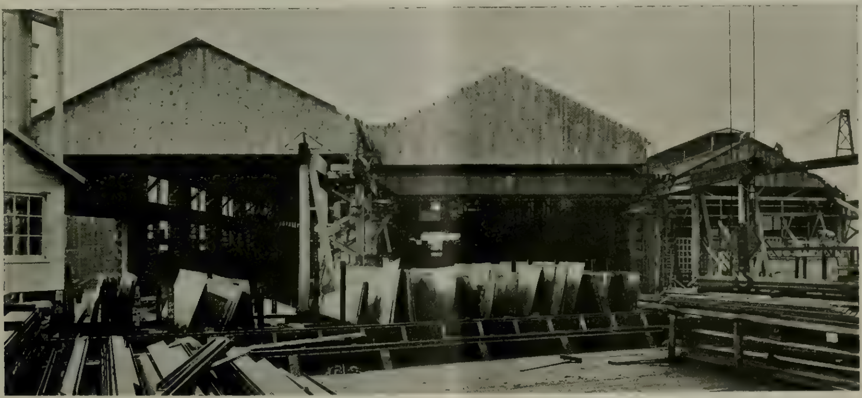
Overhead handling cranes, of various capacities, have been provided to serve all shops and main material yard. In the auxiliary storage yard material is handled by means of oil-burning locomotive cranes, while on the docks this function is performed by two electric circular cranes of 10 tons capacity.

In evolving and designing a handling system it was decided, after a thorough consideration of all possible methods and devices, to put in the present installation, as being the most practicable and best suited to plant conditions. So far it has proven sufficiently simple and entirely adequate.

By way of illustration and in explanation of the handling method employed in the plant, let us follow the steel on its course thru the yards, shops, and on the ways, first, however, touching on the physical characteristics of our plant layout. The four ways are located at the extreme southeast



View showing the building berths and actual start on vessels' hulls at the Northwest Steel Company's shipyard at Portland, Oregon.



One end of the ship tool sheds and a portion of the plate and shape storage yard at the Northwest Steel Company's shipbuilding plant.

The mould loft at the Northwest Steel Company's plant furnishes ample room for laying out work.

end, at right angles, of course, with the shore line. Paralleling them are the various shops, adjacent to which and likewise paralleling, the main material yard. The dock is situated at the east end of and at right angles with this yard, and the shops, while the auxiliary storage is in the southwest portion of the property. On receipt of a shipment of steel from the mills, each plate and shape is placed in its especially designated rack in the yards or on the dock, from whence it is handled by an overhead crane to the laying out space in the east end of the shops. After being marked, it is advanced, also by overhead crane, to the various tools in gradual stages, arriving at north end of the shops in completely fabricated condition. Here it is picked up by a locomotive crane, moved to the ways and deposited under the aerial tram at the desired berth. Ample space is provided at forward ends of the ways for fabricated items, to eliminate congestion while material is awaiting erection. From this point the aerial tram handles each item to its proper position in the ship.

General

A considerable portion of the usual field work is performed in the shops. For instance, they fabricate completely (including all riveting) the floors, side frames and bilge brackets, gusset plates, etc., in the shops, thus contributing materially toward rapid erection and construction in the ships. It is quite unnecessary to dwell at any length on the respective merits of the two methods of operation, bearing in mind simply the unquestioned superiority of the pneumatic bull riveters in the shops over the ordinary air hammers in the field.

Recently all wall gantry and air cranes for handling material under tools in the shops were replaced with cantilever wall cranes which travel longitudinally, having crompressed air as motive power, thereby increasing the output of the punches by lessening the labor of handling heavy material.

Injuries to employees are looked after in an emergency hospital, where first aid is administered by graduate nurses who are in constant attendance during both day and night shifts.

While the Northwest Steel Company is compartively young in marine construction, it expects the launching of the "Vesterlide," its first steamer, to take place within the next few weeks, and has three other vessels now on the ways.

All the vessels under contract are of one standard design, being cargo steamers of the poop, bridge, and forecastle type, having length of 425 feet o. a., beam of 54 feet, and molded depth of 29 feet 9 inches. They are of 8800 tons d. w. capacity, turbine propelled, steam being supplied by three Scotch boilers adapted to the use of either coal or oil fuel.

The activities of the plant are not restricted to shipbuilding, as it has been for many years the largest fabricators of structural steel in the West.

IN VICTORIA

Mr. J. H. Price, who was lately elected president of the Cameron-Genoa Mills Shipbuilders, Ltd., has now taken actual charge of the construction work going on at that plant. Six vessels are now on order for Mr. H. W. Brown. The first launching will take place about the middle of January, or about the same time as the Wallace Shipyards, Ltd., of North Vancouver, put their first hull overboard. Mr. Brown has ordered these first six vessels on behalf of the Canada West Coast Steamship Company, of which he is the head.

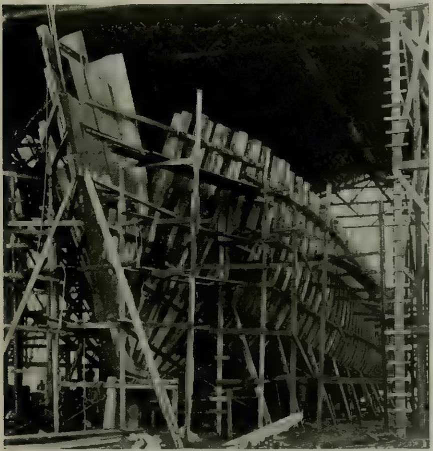
All six vessels are of the usual auxiliary schooner type—length over all 250 feet, beam 44 feet, depth 20 feet, lumber capacity 1,500,000 feet. They will be fitted with the usual steam schooner cargo handling equipment, capable of handling 400,000 feet of lumber a day. Steam for the winches will be supplied by a 150 h. p. boiler, the boilers for all six vessels having been ordered from the Victoria Machinery Depot, which concern is also handling the tank work. Special arrangements are being made on all these schooners to carry two apprentices, this being a part of the scheme to induce young Canadians to follow the sea as a profession.

View of the ship sheds of the Columbia Engineering Works from the river front.

THE COLUMBIA ENGINEERING COMPANY

The shipbuilding yards of this concern are located at Linnton, eight miles west of Portland, on the Willamette River, and have 1000 feet of river frontage.

There are two four-masted auxiliary schooners under construction at this yard. No. 1, the "Warren P. Brown," is 156 feet long on keel, 36 feet extreme beam and 14 feet moulded depth. She will be a twin-screw boat driven by a pair of 200 h. p. Wolverine engines, and her delivery is slated for about March 1, 1917. No. 2, as yet unnamed, is the same as No. 1, with the exception that she is eleven feet longer. She will be rigged as a baldheaded schooner. The second vessel is booked for delivery on May 1, 1917. Three other vessels are contracted for, and the keels will be laid as soon as slips number three and four, work on which is well along, are completed. The first two slips are covered, the sheds being 60 by 200 feet in size with 12-foot runways on each side and in the center. What are generally termed "Arc" ways are used at this yard, in order to meet the conditions met through the river being at different stages during the year. The lower ends of the ways have a ten per cent gradient, which precludes any tendency towards sticking.



Bow view of vessel No. 1 at the Columbia Engineering Works.

The officers of the Columbia Engineering Company are: S. M. Mears, President; A. M. Mears, Treasurer; C. W. Steel, Secretary; and J. C. Langille, Superintendent of Construction.

SEABORN SHIPBUILDING COMPANY

With the schooner "Seaborn" launched during December, an 187-foot schooner building for Ostrander and Morrison of Seattle to be launched during the present month, and the keel of a third vessel being laid, the "Seaborn" yard is fairly busy. The vessel being just laid down will be 260 feet long over all, 44 feet beam outside planking, and 21 feet deep. She will be rigged as a five-masted bald-headed schooner, and will be powered with a pair of 240 h. p. Skandia engines.

BRITISH COLUMBIA SHIPBUILDING

With the launch of the "Mable Brown" from the Wallace Shipyards in North Vancouver for the Canadian West Coast Navigation Company, British Columbia is fairly started on her new career as a shipbuilding province. A second vessel, the "Geraldine Wolvin," a sister ship to the "Mable Brown,"will slide down the ways about the middle of the present month. The Cameron, Genoa Mills Shipbuilders, Ltd., of Victoria, are also launching a vessel sometime in January for the same owners.

Still another Tacoma wooden shipbuilding firm is announced in the prospectus of the People's Shipbuilding and Construction Company, which concern has secured a 20-acre tract at Gig Harbor as a site for their shipbuilding operations.

One of the latest of the big fleet of new Japanese freighters to reach this coast was the "Siam Maru" of the Osaka Shosen Kaisha fleet. She sailed from Kobe on November 3 (just 66 days after her launching) for Puget Sound ports. She is 385 by 51 by 36 feet molded dimensions, and has a deadweight capacity of 7871 tons. The "Siam Maru" was built by the Kawasaka Dockyard Company at Kobe.

The Seattle fireboat "Snoqualmie" is undergoing extensive overhauling at the West Seattle yard of Kinge and Winge.

Waterfront of the Moore and Scott Iron Works' plant, Oakland, California.

Ships and Engines

ALL the districts on the West Coast of the United States and British Columbia that have hitherto engaged in shipbuilding have made tremendous strides in expanding this industry during the past eighteen months. The British Columbia, Puget Sound, Columbia River and San Francisco Bay districts, with their adjacent territories, have all experienced a remarkably rapid development, and while Southern California is only represented by one steel yard, the California Shipbuilding Company, and several small wooden shipbuilding concerns, there are rumors of big developments in the southland as well.

Around San Francisco Bay the most significant happenings have occurred along the Oakland Estuary. Here we have two distinct lines of development, the building of ships and the building of marine engines.

In the case of shipbuilding, we have seen during the year just passed the entire remodeling of the Moore and Scott Iron Works, the erection of new buildings at this plant, the installation of a large amount of modern machinery and the acceptance of orders for seven large steel vessels, one of which has already been launched and the second of which will be put overboard during the present month. The Union Iron Works Co. has purchased the United Engineering Works and erected a modern shipyard, at which they will carry on government work as well as private contracts, having already received orders for six torpedoboat destroyers. These two yards will insure the launching of a new vessel into the Oakland Estuary once a month. In both these cases, this section of the San Francisco Bay district benefits through the efforts of old shipbuilding firms, Moore and Scott expanding an old established business to meet a hugely increased demand and the Union Iron Works building up a great branch establishment around the United Engineering Company's plant as a neucleus.

In the case of wooden shipbuilding also, there has been practically no new firms enter the field in Oakland, although the Hanlon Shipbuilding and Dry Dock Company has created a big new yard,

View in the Hanlon Shipbuilding and Dry Dock Company's plant, showing the big marine railway occupied.

Hanlon Shipbuilding and Dry Dock Company, showing a vessel on the dock and a big barkentine on the stocks.

and has intentions of still further enlarging its facilities for turning out high class wooden construction. This concern is building the largest wooden vessel on the bay, and those capable of judging have pronounced her hull a remarkably fine piece of workmanship. Hanlon operates a large marine railway and does a great deal of repair work, the recent overhauling and auxiliary powering of the "Hugh Hogan" being a good example of the extent of the repair work going on at this yard.

W. F. Stone, one of the best known yacht and launch builders on the Pacific Coast, was also pressed into service to help supply the demand for large wooden hulls, and the result has been the two fine steam schooners, one for Sudden and Christensen, and the other for J. R. Hanify, now nearing completion at his yard. W. S. Brusstar Jr. recently completed the fine trading schooner "Avarua," built to the order of Atkins and Kroll, for South Sea trading. The Brusstar yard is also busy on a large number of small craft, mostly built to the order of the Government. The Pacific Shipyard and Ways and a few other plants along the Estuary may accept contracts for wooden hulls at any time, still further swelling the tonnage outfit of this rapidly developing shipbuilding center.

While shipbuilding interests in Oakland and Alameda have been growing rapidly, the development of this section as a marine engine building center has by no means lagged behind. Only last month J. H. Hansen and Company purchased the Gorham Engineering Works, and have started to develop a large factory for the manufacture of Skandia Semi-Diesel engines. This engine has met with such a large measure of success on the Pacific Coast that it became practically imperative that it be manufactured on the ground. With the shops and tools already on hand at the Gorham works and the new machinery being installed, this firm is destined to play a large part in the industrial growth of the east bay section.

The recent consolidation of the Atlas and Imperial Gas Engine Companies, the doubling of their shop capacities, and the success that has met the Atlas Diesel engine, all point to a splendid future for the newly formed Atlas-Imperial Engine Company.

Building slips and handling equipment at the Alameda plant of the Union Iron Works Company.

A still earlier combination and one that has justly been considered one of the most important events of the year in western engineering circles, was the absorption of the Corliss Gas Engine Company by the Standard Gas Engine Company and the securing by the latter firm of the manufacturing and distributing rights for the Pacific Coast of the Southwark-Harris Valveless Oil Engine. The Standard people have also just made extensive additions to their shop facilities.

Another bit of engineering history that is bound to play a highly important part in the development of the heavy oil engine on the Pacific Coast is the taking up of the Craig Diesel by the Union Gas Engine Company. This concern is perhaps as well known as any gas engine company in the world, having the double distinction of being pioneers in this important industry, and also of having made the largest marine gas engines yet attempted. The Union Company, which enjoys a very large export trade, its engines being very popular throughout the Orient and Oceanica, will shortly be serving the same wide field with one of the best known American-built Diesel engines.

All of these developments of the year that has just drawn to a close clearly point to the fact that a splendid future lies before the Oakland Estuary district as a producer of both ships and marine engines.

The California Shipbuilding Company

The U. S. Torpedoboat Destroyer, "Stewart" on the dry dock of the California Shipbuilding Company.

THE California Shipbuilding Company on January 1, 1916, purchased the Craig Shipyard at Long Beach, California, and is now the only steel shipbuilding company in Southern California. The shipyard embraces an area of about twenty acres with a long water front and a large dry dock slip. It is located on the land-locked harbor of Long Beach, adjacent to San Pedro harbor, and will be well protected in time of war by the Government fortifications now under construction at San Pedro. The layout of the yard, in relation to the harbor, readily lends itself to the side-launching method, and the entire water front is fitted with a building berth on that principal. Two overhead traveling cranes, running the length of the berth, and with various spur railroad tracks and smaller cranes, form a rapid method of handling material. The plant is well equipped for all manner of repair work, having a well equipped pattern shop, machine shop, brass and iron foundry, galvanizing shop, blacksmith shop, copper shop and a 3,000 ton dry dock. The dry dock was designed by Wm. Donnelly, New York; is of self-docking, electric-driven type, and can easily be increased to 7,000 tons should occasion arise.

Electricity furnishes all the power throughout the yard, while fuel oil is used in the blacksmith shop, riveting forges and boilers. The Union Oil Company's pipe line runs into the yard, and the Standard Oil Company has service stations adjacent. The works have been largely improved during the past few months, and are now in excellent condition. The work on hand consists of five submarines, two of which, Submarines L-6 and L-7, were launched during September, and a lighthouse tender for the United States Government. The policy of the Company has been to hold itself in readiness for the Government preparedness program, and on this account has turned down many profitable merchant contracts.

In addition to freight steamers, lumber carriers, dredges, tugs and submarine torpedo boats, the Company handles a large part of the repair work in this section. A 50-ton sheer legs is now being erected.

The officers of the California Shipbuilding Company are: George H. Bixby, president; W. C. Foley, vice-president and general manager; W. G. Bunnell, secretary and electrical engineer; P. E. Hatch, treasurer; A. L. Becker, chief engineer; T. E. Hammond, assistant to general manager; R. H. M. Robinson, consulting engineer.

AN IMPROVED PROTRACTOR

For the appended description and accompanying sketch of an improved protractor we are indebted to Mr. Evert H. Sandelin, 2nd officer of the Matson Navigation Company's steamer "Wilhelmina." Mr. Sandelin suggests that navigators running between the Pacific Coast and the Hawaiian Islands or the Orient try out this protractor as these runs are peculiarily suitable to its use. His detailed explanation, which, with the sketch here-

Launching the U. S. Submarine "L-7" from the ways of the California Shipbuilding Company.

with, renders the use of the protractor readily understood, is as follows:

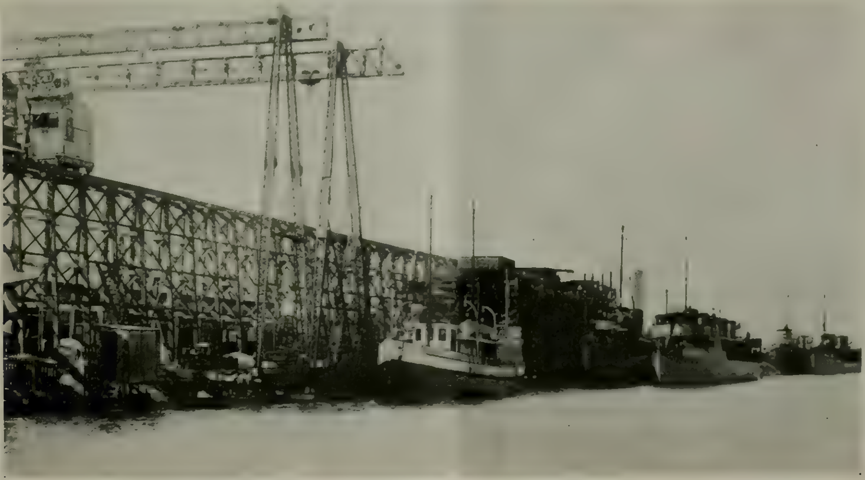
"For navigators who prefer using the protractor when laying out and reading courses, I shall here show how the protractor, with a single device, even can be used for laying out or reading off position of latitude and longitude. Although its use is limited, as will be seen it may favorably be used on many regular runs where the change in latitude is not too large or the latitude too high, and provided mercators charts are used.

"The meridians and parallels on the above mentioned ocean chart are usually 5 deg. apart. For a run with a change in latitude of 20 deg., say, between 25 deg.-40 deg. north, choose a transparent celluloid protractor with a radia larger than the length on the chart between 35 deg.-40 deg. parallels. On the protractors down face side, along the radia dividing it in two equals, cut in the 35 deg.-40 deg. latitude scale projecting left for the north latitude 40 deg. down at the corda and 35 deg. towards the periphery. To the left of and parallel to this, cut in the 30 deg.-35 deg. latitude scale 35 deg. down and 30 deg. upward and proceed in same way with the next scale 25 deg.-30 deg., all scales to be taken from the chart in use.

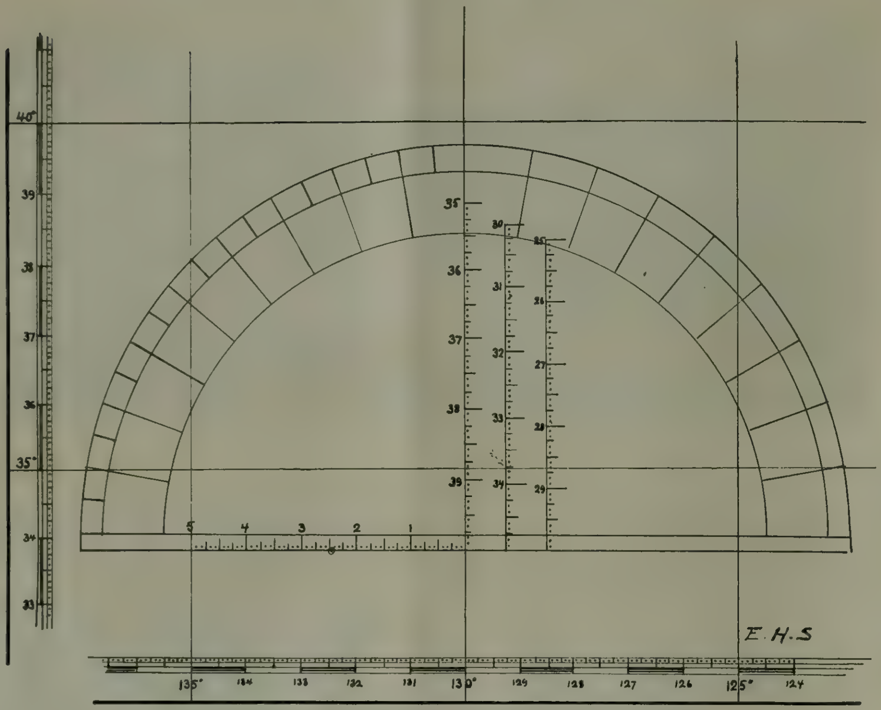
"Five degrees of the longtitude scale should then be cut in along the protractors corda, also on the down face side,, from the radia dividing it in two equals projecting right. The protractor is now ready, and when laid down right side up, the longitude scale will appear along the corda from middle to left and the latitude scales from middle to right, decreasing in length and perpendicular to the corda.

"The best accuracy in cutting in the scales is obtained by laying the protractor over the chart's scales, and thus marked off first with a pin.

"The following sketch will explain better than words.



A close-up view of the building ways and water front of the California Shipbuilding Company at Long Beach, Calif.



Novel method of using a protractor as worked out by Mr. E. H. Sandelin.

"In laying out, say, latitude 33 deg. 47′ N. Longitude 132 deg. 28′ West, lay the protractor with its radia dividing it in two equals on the nearest meridian to the right, in this case the 130 deg., and move the protractor up or down till 33 deg. 47′ on its latitude scale coincides with the 35 deg. parallel. The corda is then in latitude 33 deg. 47′ N. on the chart, and by making a mark on the chart right under where 2 deg. 28′ reads on the protractor's longitude scale, it is done.

"For reading off a position of latitude and longitude, lay the protractor corda over the position and the perpendicular radia coinciding with the nearest meridian to the right. If the latitude is between 35 deg.-40 deg., read off the protractor's 35 deg.-40 deg. scale where it is cut by the 40 deg. parallel, which is the latitude; and the longitude is gotten by adding to the meridian used, the degrees and minutes read off from the protractor's longitude scale to the position.

"For east longitude the scales could be changed right and left sides on the protractor; and for south latitude the latitude scales could be reversed or the protractor laid down with the corda up.

"As is seen, its use is limited, but, when applyable, it saves time, does away with parallel rule and dividers, often too sharp pointed for many or too slack or too tight; and also preserves the chart.

MARE ISLAND ACTIVITIES

The U. S. Torpedoboat Destroyer Shaw, was successfully launched at Mare Island on December 9, the day being made the occasion for a double ceremony, as on the same afternoon the keel laying ceremony of the destroyer Caldwell was carried out on the same slip that the Shaw had just left vacant.

The Shaw is 315 feet 3 inches long, 29 feet 10 inches beam and 9 feet 6 inches draft. Her trial displacement will be 1110 tons, and the contract speed is 29½ knots. She is fitted with four water-tube boilers, oil burning, working at 265 pounds pressure and furnishing steam for Parsons turbines on the twin screws, the shaft h. p. being 17,000.

The Caldwell is somewhat different in dimensions, being beamier with a lighter draft; she is 315 feet 6 inches long, 30 feet 7 inches beam and 7 feet 10 inches draft. Trial displacement 1085 tons, and expected speed 32 knots. Her steam plant will be practically the same as that of the Shaw, but her general electric turbines will drive generators, her twin screws being motor driven. While the electric drive of the Caldwell will prove of great interest to marine engineers, details of the installation are not yet available.

The Torpedoboat Destroyer "Shaw" was no sooner put overboard than the keel of another destroyer was laid in the same building slip.

December's activities at the Mare Island Navy Yard included the launching of a destroyer and the keel-laying ceremonies of the battleship "California."

S. S. "Edward Luckenbach"

A NOTABLE addition to the fast-growing mercantile fleet of the United States has recently been made in the delivery of the freight steamer "Edward Luckenbach." This vessel, the first of five now under construction for the Luckenbach Steamship Co. of New York and San Francisco, by the Fore River Shipbuilding Corporation of Quincy, Mass., represents the highest type of general freight vessel, and in its design and construction reflects credit on both builders and owners.

The "Edward Luckenbach" was designed to the owners' special requirements for coast-to-coast and overseas trade, and in the adoption of a modified cruiser stern a novel arrangement of bridge and deck house bulwarks, with two masts and eight king posts and one large smokestack, inaugurates for the Luckenbach Steamship Co. a handsome vessel of individuality and distinctive appearance.

As will be seen from the accompanying photographs, this vessel is of the shelter deck type, with large cargo hatches, wide spaced hold stanchions, wide spaced frames and no side stringers, and has been constructed under the special survey and to meet the full requirements for hull, equipment and machinery of both the American Bureau of Shipping and Lloyd's Register of Shipping, to obtain the highest classification ratings with freeboard assignment, in the records of both societies.

The "Edward Luckenbach" is of the following dimensions:

Length over all	456′ 5″
Length from for'd side of stem to after side of rudder post	437′ 6″
Breadth molded	57′ 0″
Depth molded to shelter deck at side	41′ 6″
Gross tonnage	8151
Net tonnage	6141
Panama Canal gross tonnage	8543
Panama Canal net tonnage	6426
Loaded draft	31′ 8″
Deadweight (tons)	12250
Height between shelter and upper decks	9′ 6″
Height between upper and second decks	9′ 0″
Fuel oil capacity (tons)	2131
Capacity of cargo holds (cubic feet)	584270

There are three continuous steel decks running the full length of vessel, named Shelter, Upper and Second respectively. The second deck beams are in excess of Classification Societies' requirements, and, with a 'tween deck height of 9′ 6″, this vessel readily adapts itself for use as a transport or for carrying cattle.

The double bottoms are constructed on the alternating solid and bracketed floor principle, and, with the forward and after peak tanks, are arranged for the stowage of fuel oil. The fuel oil settling tanks and the fresh and boiler feed water tanks are located in the 'tween deck spaces outboard of the machinery casings.

The arrangement of masts, kingposts and deck winches has been made with a view to the rapid handling of general freight. The foremast has one 30-ton and four 5-ton booms, the mainmast one 20-ton and four 5-ton booms, and each of the eight kingposts has two 5-ton booms. The deck winches, constructed by the Hyde Windlass Co. to the special requirements of the owners, are 24 in number, 20 being single geared and 4 compound-geared, all with cylinders 8¼″ x 10″.

The steering machinery, also furnished by the Hyde Windlass Co., is of the Brown steam tiller type, with cylinders 9″ x 12″, and operated by telemotor from the pilot house and flying bridge and by shafting from double wheel hand gear stand on top of after deck house.

The windlass and after warping capstan were supplied by the American Engineering Co., the former being of the worm drive type, having the windlass on shelter deck, and a double 14″ x 12″ cylinder inserted engine on deck below; it is the No. 12 size, and arranged to take 2⅜″ stud link chain. The warping capstan engine, having 8″ x 10″ double cylinders, is located in the steering engine room and operates two 19″ dia. gypsy heads on shelter deck.

Special attention has been given to the ventilation of cargo holds, each hold and 'tween deck cargo space having a natural supply of air through cowl ventilator, and a mechanical exhaust by four Sturtevant electric-driven exhaust fans, each having a rated capacity of 6000 cu. ft. of air per minute; these fans being located in the fore peak boiler room, engine room and steering engine room and exhausting to atmosphere.

In view of the long voyages the "Edward Luckenbach" will travel, the comfort and habability of the officers and crews' quarters were given special consideration by the owners. The navigating bridge is entirely enclosed, thus ensuring comfort to the officers on watch in all weathers. The interior of this enclosed bridge, together with the dining saloon, captain's suite, and owner's stateroom, are attractively paneled in white enamel and mahoganized birch. The rooms for senior and junior officers are commodious and well-arranged, and are each furnished with ample locker and drawer space, and with upholstered settees. The crew and firemen are berthed in the after deck house, in large rooms, and they also are well equipped with individual metal lockers and drawers below the berths.

The propelling machinery is located amidships, and consists of a Curtis turbine driving the propeller shaft through a double reduction gear at a designed normal speed to deliver 4000 shaft horse power at 90 revolutions of the propeller shaft. The turbine is fitted with over load nozzles so that the machinery will develop 4500 shaft horsepower, with a propeller speed of 93 revolutions per minute. The turbine is designed to operate with a steam pressure of 190 lbs. in the steam chest and against a vacuum of 28½", with the astern turbine capable of delivering to the shaft about 50% of the power of the ahead turbine. The rotor is so arranged that the ahead and reverse wheels are carried on one shaft and operate in the same casing—the main exhaust being common to the ahead and reverse. The turbine is very substantially built of high-grade steel, the blading being of Monel metal, of heavy proportions, and the revolving element is designed so that it can easily stand an overspeed of 20% above the full speed revolutions.

The steamer "Edward Luckenbach" on trial. This is the first of five fine freighters building for the Luckenbach Steamship Co. at the Fore River Shipbuilding Corporation's plant.

The total reduction of speed between the turbine and propeller shaft is 37 to 1. The reduction is taken in two steps, the system employed being what is known as the double-drive type, that is, the pinion connected with the turbine engages with two gears, one diametrically opposite the other, thereby eliminating pressure on the pinion bearings and insuring perfect tooth contact between the pinion and the wheels. Each of the two wheels is coupled to a pinion, which in turn drive the main gear coupled to the propeller shaft. The high speed pinion is directly connected to the turbine shaft by means of a flexible coupling, so arranged that any motion in the gears or pinions will not be transmitted to the turbine shaft. The gears are double helical and are arranged in one plane so that bearings and wheels can be easily examined and all parts readily kept in alignment. The turbines and gears were built by the General Electric Co., the gears being of the laminated type manufactured under the Alquist patents.

The propeller is 19' diameter, with the blades set at a pitch of 16'. The pitch, however, is adjustable from 15' to 17'. The propeller blades are of manganese bronze and the hub of cast iron, fitted to the propeller shaft with a taper and key and held by a forged steel nut.

Steam is supplied by three Scotch boilers, each 16' 6" inside diameter, and 12' 3" long over the heads, with a heating surface of 3546 sq. ft., each boiler having four Morrison corrugated furnaces, 42" inside diameter. The boilers are designed for a pressure of 195 lbs. per sq. in., and work under the heated system of forced draft, for which one Sturtevant multivane blower fan with two engines is located in the engine room. The boilers are arranged to burn fuel oil on the Dahl system, the necessary pumps, filters, heaters, etc., being arranged in the fireroom.

The main condenser of special construction for turbine work is placed on the port side of the engine, having a cooling surface of 5850 sq. ft. The air pump, furnished by Blake & Knowles, is of the independent wet and dry twinplex beam type, the necessary cooling water being supplied by the main centrifugal pump, having an 18" suction and discharge and driven by a 10" x 9" single cylinder vertical engine of the enclosed type and supplied with forced lubrication.

The necessary pumps, which are of the Blake & Knowles type, the high and low feed water heaters of Griscom Spencer make, and an auxiliary condenser are located conveniently in the engine room. Abaft of the reduction gear is the thrust bearing, consisting of ten horseshoes with ample wearing surfaces. The line shafting consists of seven sections, with the necessary bearings.

The electric plant consists of two 20 kilowatt General Electric generator sets, driven by reciprocating engines. There is a 2-ton Brunswick refrigerating machine and a Griscom Spencer evaporating machine of 35 tons capacity.

The "Edward Luckenbach" was taken out on trial on November 28th, the ship being in light condition, with measuring tanks and pumps installed, so that the water measured by the main turbines alone, and the turbines and auxiliaries combined, could be carefully ascertained. A torsion meter was fitted on the propeller shaft, the shaft having been calibrated together with the torsion meter before being installed on board. The oil used on the trial was heavy Mexican, which on test showed only 18170 B. T. U.'s. The whole of the machinery operated very satisfactorily, and after anchoring at Boston Harbor for a couple of hours the vessel proceeded to New York, the trip from Boston to New York occupying about 22 hours.

The following table gives data taken on the trial trip. The results are considered very satisfactory as, at normal designed rate of operating, the water rate of the turbines was only 11.2 lbs. per s. h. p., and the water rate of the combined turbine and auxiliary machinery was but 12.67 lbs. per s. h. p. of the main engines:

TRIAL TRIP DATA

	Revolutions			S. H.P			Fuel Oil.		Water Turb. Only.	
Time	Counter Reading	Period	R. P. M. Period	T. Meter Read. 4834	Period	Meter Read	Lbs. Per Hour	Lbs. Per S. H. P.	Lbs. Per Hour Period	Water Rate Period
12.00	125436	—	—	70	——	900	—	—	—	—
12.10	126282	846	84.6	78	3190	967	—	—	—	—
12.20	127135	853	85.3	76	3140	1075	—	—	—	—
12.30	127999	864	86.4	81.5	3400	1114	—	—	—	—
Ave.	—	—	85.4	—	3265	—	3200	.980	39700	12.17
12.40	128876	877	87.7	85.0	3600	1178	—	—	—	—
12.50	129764	888	88.8	85.5	3670	1268	—	—	—	—
1.00	130658	894	89.4	89.5	3865	1362	—	—	—	—
1.10	131547	889	88.9	86.5	3715	1422	—	—	—	—
1.20	132440	893	89.3	88.5	3820	1522	—	—	—	—
1.30	133346	906	90.6	89.5	3920	1610	—	—	—	—
Ave.	—	—	89.1	—	3787	—	3710	.980	42600	11.24
1.40	134261	915	91.5	90.0	3980	1715	—	—	—	—
1.50	135189	928	92.8	94.0	4210	1812	—	—	—	—
2.00	136122	933	93.3	94.0	4235	1902	—	—	—	—
2.10	137055	933	93.3	95.0	4280	1986	—	—	—	—
2 20	137986	931	93.1	94.0	4230	2065	—	—	—	—
2.30	138916	930	93.0	92.5	4150	2173	—	—	—	—
Ave.	—	—	92.8	—	4181	—	4210	1.007	46650	11.17
MEASURING WATER FOR ALL PURPOSES										
2 30	138916	—	—	—	——	2173	—	—	—	—
2.40	139844	928	92.8	96	4300	2254	—	—	—	—
2.50	140773	929	92.9	96	4310	2352	—	—	—	—
3.00	141702	929	92.9	97	4350	2450	—	—	—	—
Ave.	—	—	92.9	—	4320	—	4140	.960	54800	12.67
Overload	—	—	98	110.5	5230	With 2 overload nozzle valves open.				

Draft=10′ 4½″ forward, 18′ 9″ aft.
Speed by log, 14 knots.
Fuel oil 18170 B. T. U. per lb.
0.894 Sp. Gr. @ 60 F.

Displacement=7300 tons.

ENGINE ROOM

	Pressures Lbs. Gauge				Bearings		Temperature of		
Period	Main Steam	Steam Chest	Oil	Vacuum	For'd.	Aft	Injection	Discharge	Room
12.00 to 12.30	176.8	137.3	8 8	28 75	103.5	85.5	44	69	74
12.30 to 1.30	179.4	159.3	12.0	28 75	103.3	98	45	64.7	75
1.30 to 2.30	191.0	176.1	17.0	28 75	103.0	117.7	45	66.3	79
2.30 to 3.00	194.0	179.0	17.0	28 90	102	116.5	43.5	65.0	78.5
Overload	195	170	28.75						

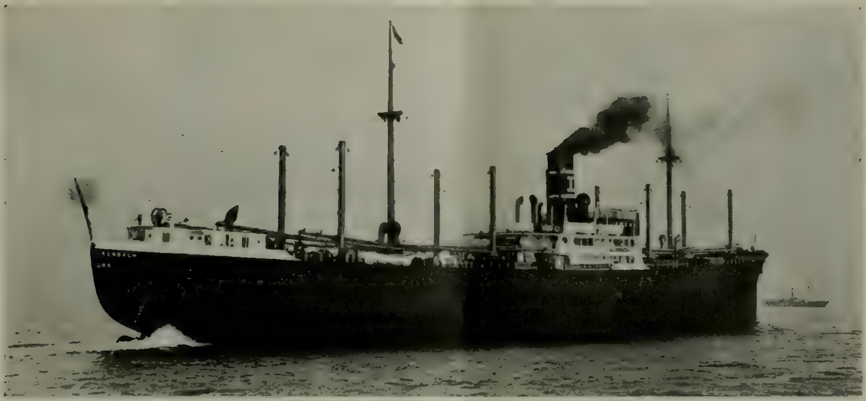
FIRE ROOM

	Pressures Lbs. Gauge Main Steam at Boilers			Fuel Oil at	Temperatures of Fuel Oil Heater			Air Press
Period	Stbd.	Center	Port	Burners	Inlet	Outlet	Room	Inches
12.00 to 12.30	185.5	182.8	183.5	121.7	103.7	247.8	96.7	.9
12.30 to 1.30	182.1	179.3	179.9	146.4	104.6	248.2	92.9	.87
1.30 to 2.30	192.4	189.2	189.4	165.7	99.3	253.6	88.9	.93
2.30 to 3.00	196	192.5	192.5	158 8	97.5	254.0	86.0	.98

THE NAVY YARD COMMISSION

During the early part of December, the Commission on Navy Yards and Stations held sittings in San Francisco to decide on the merits of the various sites put forward as locations for the proposed Pacific Coast naval base. The Commission is an able one, being headed by Admiral James M. Helm, the other members being: Captain G. W. McElroy, Rear-Admiral W. L. Capps, Captain H. H. Rousseau of the Engineers Corps, and Commander C. L. Hussey.

Several San Francisco Bay sites were put forward for the consideration of this Board. If San Francisco Bay is chosen as the site of the naval base, the question naturally restricts itself into the development of the present naval yard or the securing and improvement of a new location. The one serious objection to Mare Island is the necessity



Quartering view of the "Edward Luckenbach," showing the modified cruiser stern, one of the features that give this vessel a distinctive appearance.

of dredging to maintain a deep water channel. Several of the sites proposed by enthusiastic communities around the Bay have even more of a dredging problem than Mare Island. It would seem natural that if the Board decided that San Francisco Bay was the proper site for a naval base, and that Mare Island was not the best location, that the site selected could only be one where a dredged channel was not necessary. However, as at least two of the Board, Rear-Admiral Capps and Captain McElroy, are thoroughly familiar with San Francisco Bay, both having been stationed on inspection service at the Union Iron Works for several years, the Board will be able to reach a very clear decision as to the advantages and disadvantages of every site put forward.

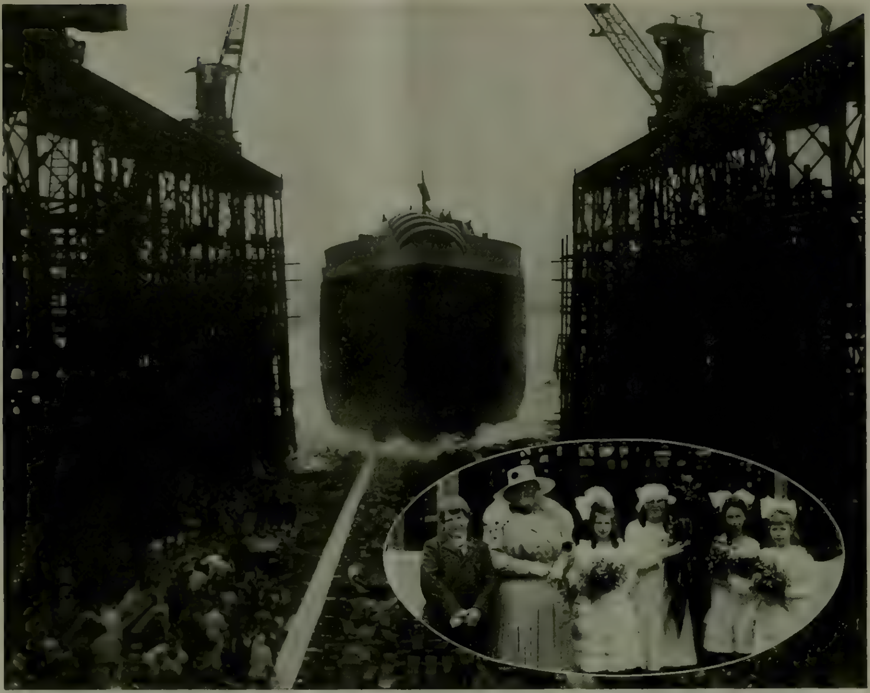
The Board is examining sites all along the coast from San Diego to Puget Sound. The latter location has undoubtedly many advantages, owing to the growing importance of Alaska. However, the choosing of a geographical location is almost purely a naval question, and the Board can be trusted to give this phase of the question the fullest consideration.

SHIPBUILDING

The Seattle Construction and Dry Dock Company is to build one of the scout cruisers for the navy. The contract price is $4,975,000, delivery 30 months. The leading feature of the vessel will be her extremely high speed—35 knots.

This year's submarine building programme has been divided up as follows: Electric Boat Company, 18 at $697,000 each; Lake Torpedo Boat Company, 6 at $694,000 each; California Shipbuilding Company, 3 at $698,000 each; Electric Boat Company, one 800-ton boat at $1,195,000, and the Portsmouth Navy Yard one 800-ton boat.

The Government Board which is now engaged in preparing a report on the relative merits of naval base sites on the Pacific Coast. From left to right: H. H. Rousseau, formerly of the Isthmian Canal Commission; W. L. Capps, Chief Constructor U. S. Navy; Commander C. L. Hussey, General Board U. S. Navy; C. W. McElroy, Captain Bureau of Steam Engineering U. S. Navy; and Rear-Admiral J. M. Helm, Chairman of the Board.



A recent launching at the Union Iron Works, the "J. W. Van Dyke," with the launching party. Miss Josephine Tynan acted as sponsor for the big tanker.

LAUNCH OF THE VAN DYKE

Launchings at either one or the other of the Union Iron Works' plants are becoming quite a common thing. The last vessel to leave the ways prior to the launching of the "Maui" was the J. W. Van Dyke, a 7200-barrel tanker, 435 feet long and 56 feet beam. Miss Josephine Tynan, daughter of J. J. Tynan, general manager of the Union Iron Works, acted as sponsor for the big tanker. Among those who were interested spectators at the ceremony were Captain William McKeon of Philadelphia, port captain for the Atlantic Refining Company, to whose order the Van Dyke is being built; J. C. Rohlfs, marine superintendent of the Standard Oil Company of California, and J. R. Christy, manager of the Alameda plant of the Union Iron Works.

PHYLLIS IS LAUNCHED

The steam schooner Phyllis, built to the order of the Byxbee, Clark Lumber Company by Andrew Peterson of Aberdeen, Wash., was launched on Dec. 28th. Moulded dimension 245 by 42½ by 17½ feet, 1,250,000 feet lumber capacity. The ship will be driven by an 850 h. p. triple expansion engine built and to be installed at San Francisco by the Main Street Iron Works. Steam will be supplied by B. & W. boilers.

The Phyllis was Peterson's fourth launch within ten months, the others being: The steam schooner Oregon for the Wilson Lumber Co., the auxiliary schooner Columbia River for Balfour, Guthrie and Company, and the schooner Idaho for the Wilson Brothers' Lumber Company.

SEATTLE BUILT BOILERS

The Commercial Boiler Works, a well known Seattle firm, recently shipped six Scotch marine boilers to San Francisco. Three of these are consigned to Moore and Scott and are for hull No. 110 at that yard, and three are for hull No. 16, building at the Alameda plant of the Union Iron Works Company. The Commercial Boiler Works has six more boilers on order for San Francisco and Oakland shipbuilders.

The U. S. Treasury Department has taken to the Customs Court of Appeals the question of whether or not the spare parts of steam pumps are properly classified as material to be used in the construction of a vessel, and therefore to be admitted free of duty.

The Motorship "Sierra"

Stern view of the motorship "Sierra," showing the twin screws, which are driven by 320 h. p. Bolinder engines

THE motor lumber carrier "Sierra," of the E. K. Wood Lumber Company fleet, is interesting to shipping men because she is the first lumber carrier built on the Pacific Coast with full power working on internal combustion oil engines.

It was the original intention of her owners to operate the "Sierra" in the coastwise lumber trade, but owing to the small weight of the power plant and small amount of space required to carry fuel, the original intention was abandoned and the fuel capacity was increased, with the ultimate result that the ship can now carry sufficient fuel oil for 38 days loaded cruising at over eight knots speed.

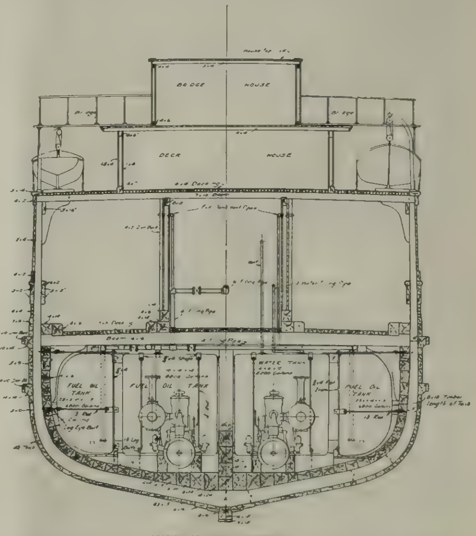
Plans for the engine installation were laid out by D. W. and R. Z. Dickie, including detail designing for the shafting, propellers, inboard and outboard bearings, fuel tanks, etc., and competitive bids for these different articles were called for from the different shops along the coast. The lowest bidder for the water tanks, all fuel tanks, and the day tanks was the Eureka Boiler Works, their bid being only one-half of the highest bid. The shafting, propellers, stuffing boxes, intermediate bearing, struts, etc., were made by the Moore and Scott Iron Works of San Francisco. The installation was made by Mr. F. E. Hogan, formerly chief engineer of the steamer "Tamalpais."

After it was decided to use the vessel on long runs through the tropics, the water tank, which was formerly intended to be placed on the after deck, was put in the hold and one of the thwartship fuel tanks was put in its place. The object of this change was to keep the water cool.

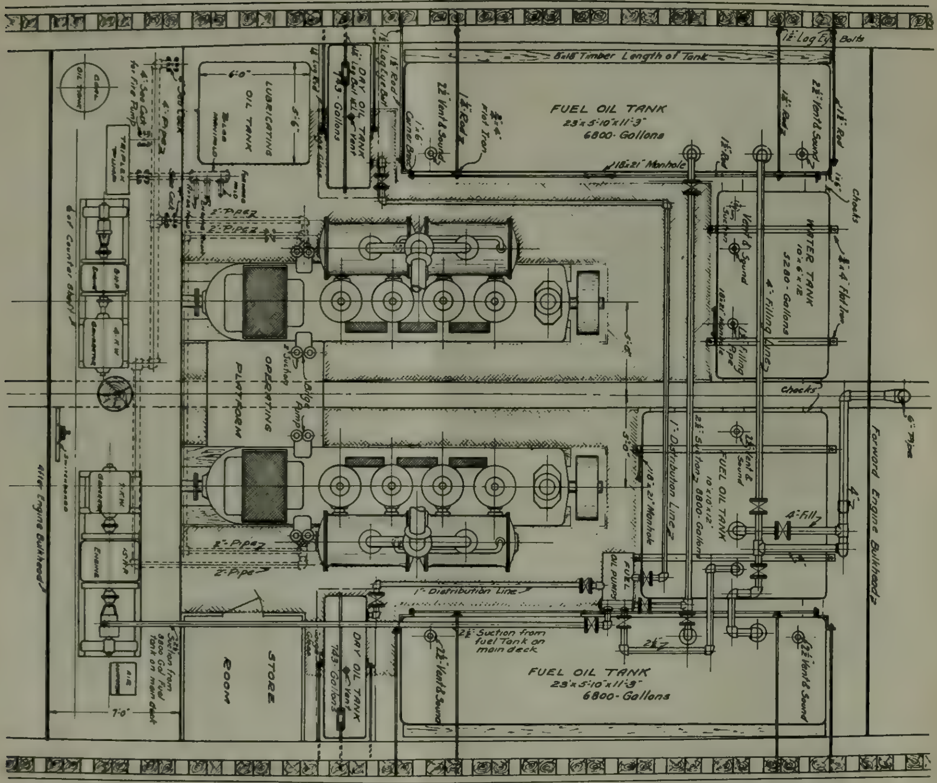
The main engines, which are four-cylinder 320 h. p. Bolinders, are placed about amidships, and exhaust into a common muffler, which is placed in a dummy stack on the top of the engine house. Two Marsh pumps are fitted to handle the oil from all fuel tanks to the day tanks. The oil piping is so arranged that each tank can be discharged independent of the others. The circulating water connections of the main engines have been cross-connected across the ship, so that the water can be used on either engine alone in case of accident; also a high and low suction has been fitted to provide for the ship working in shallow water. The controls from the main engine are carried on a central platform amidship, so that one man can operate both engines if necessary.

The "Sierra" is the first full-powered vessel of the type built on the Pacific coast. She is of the standard lumber schooner type, with engines amidships and the bridgehouse arranged with the donkey boiler on the main deck and the quarters for the officers on the boat deck above. Her general dimensions are as follows: Length over all 218 feet, length from forward side of stem to back of rudder post 211 feet 4 inches, length from rabbet of stem at waterline to after side of rudder post 209 feet 4 inches, beam over planking 42 feet 6 inches, depth moulded from rabbet to top of deck at side 19 feet 1 inch, depth of hold 15 feet; depth of keel below rabbet 11 inches.

The hull of the vessel is divided into a large hold forward and another aft, with the engine room enclosed between two bulkheads. The forward hold is loaded through a cargo hatch 24 feet



Section through main engines and wing fuel tanks, motorship "Sierra."



Plan of the motorship "Sierra's" engine room, showing wing fuel oil tanks, piping system and location of auxiliaries.

6 inches long by 12 feet wide, the after hatch being 20 feet 4 inches long by 12 feet wide. The side hatch coamings are continuous from the forecastle bulkhead forward to the poop bulkhead aft and form the sills of the donkey boiler housing and the engine skylight where they pass through the bridgehouse amidships.

The forecastle is provided with ten berths with the boatswain's locker forward, the deck being carried aft far enough to accommodate the winches for the booms on the foremast. The bridgehouse is arranged with side alleys for the stowage of deck cargo with the donkey boiler in the forward part of the housing and the engine-room hatch in the after part. The boat deck is extended aft to form a winch platform. With the exception of the captain's room on the bridge deck, all of the quarters are on the boat deck, together with the mess rooms and galley. The pilot house overhangs the forward end of bridge deck, which provides room for the ventilator stack. The poop has a stateroom on each side, with the steering room in the center.

The cargo gear is arranged with two sets of booms, one for each hatch on the after side of the foremast and mainmast, with double drum winches (cylinders 10 inches in diameter by 12 inches stroke) handling the falls. Steam for the cargo winches, capstans and anchor winch is furnished by a dry back Scotch boiler 6 feet 5 inches diameter by 7 feet 9 inches long, with a dry back 3 feet long and one 34-inch furnace. The donkey boiler is fitted to burn oil, Staples and Pfieffer system, and, in addition to furnishing steam for the deck machinery, there is a 7 by 4 by 7 inch Worthington pump in the engine room fitted to be operated with steam and serving as a spare bilge pump.

The main 320 h. p. Bolinder engines are four-cylinder, with air compressors fitted to furnish starting air and air for combustion. The cylinders are about 16½ inches in diameter and 18⅞ inches stroke, and the engine runs at 225 revolutions when developing full power. The propeller shafting is made to conform with Lloyd's rules, and is supported at the after end by means of a cast steel strut.

The auxiliary machinery consists of two Bolinder engines, one of 15 horse power, driving a 7 k. w. generator, and an air compressor for air for the whistle, and the other an 8 h. p., driving a 4 k. w. generator and a triplex bilge pump.

The main engine room is 44 feet 6 inches long, providing room for the two main wing tanks, holding 162 barrels on each side, and one tank of 221 barrels capacity forward of the starboard engine. The tank immediately aft of the bridge house contains 221 barrels, and the after tank, immediately forward of the poop, has a capacity of 359 barrels. The day tanks hold 17½ barrels each, making a total fuel oil capacity of 1160 barrels or 48,720 gallons. As these engines use 27.4 gallons of fuel each when they are developing full power, the vessel has a radius of action of 889 hours or 37 days. Some allowance must be made for head winds and unfavorable weather, but, taking the average at 7 knots an hour, the "Sierra" would have a radius of action of about 6000 miles. Forward of the port engine, a water tank containing 5280 gallons is placed.

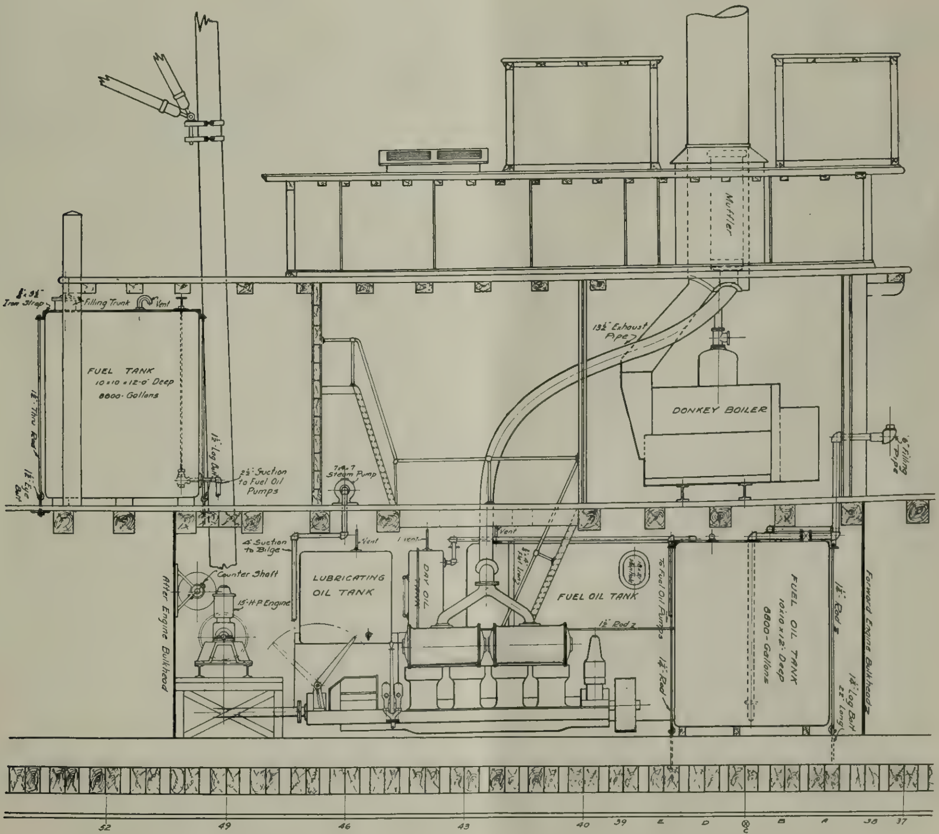
The stack from the donkey boiler and the exhaust from the main engines are led to the ventilator stack over the engine room, the muffler being in the stack as well. As mentioned before, the operating platform is placed so that both engines are controlled from one point, the governors and pump levers all coming to one place.

The hull of the "Sierra" was designed by George H. Hitchings, and the engine fuel and water tanks, shafting details, etc., were designed by D. W. and R. Z. Dickie. The donkey boiler, tanks and shafting were built under the supervision of Henry C. Tabrett.

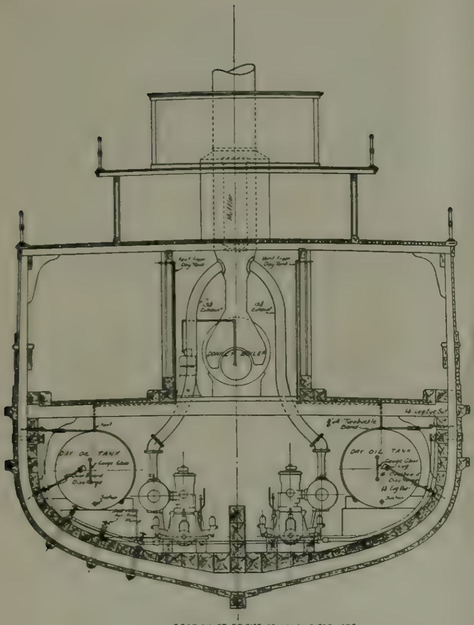
DIESEL TANKER OVERHAULED AT NEWPORT NEWS

In November, 1912, the motor-driven tanker Juno was placed in service, and she was equipped with the first high-powered reversible Diesel engine that the Werkspoor Company of Amsterdam built for marine purposes—this motor being of 1100 b. h. p. (1460 i. h. p. at 115 r. p. m., with mechanical efficiency of 78 percent, and an m. e. p. of 105 pounds per square inch), or equivalent to about 1300 steam i. h. p.

This ship has recently been docked at Newport



Longitudinal elevation through the engine room of the "Sierra," showing arrangement of the tanks, donkey boiler, etc.



Section through engine room, motorship "Sierra," showing day tanks and donkey boiler.

News to have the Lloyds No. 1 Survey, which takes place at the end of four years' service. According to Mr. Charles Bailey, the chief engineer of the Newport News Shipbuilding & Dry Dock Co., a thorough examination was made of the hull and machinery, but very little work on the engine was found necessary. One of the company's engineers accompanied the Juno to the Capes, and reported the running of the machinery as very satisfactory.

The "Juno" is of 4300 tons displacement, and carries about 2500 tons of cargo on a d. w. c. of 2675 tons, at an average loaded speed of 9¾ knots, and with a fuel consumption of a little under five (5) tons of crude oil per day. Her engine has six cylinders, 22 in. bore by 39⅜ in. stroke. Her engine-room staff consists of chief, first, second, and third engineers, four oilers and two cleaners. The lubricating oil consumption is about 20 gallons per 24-hour day. Her length b. p. is 258 feet, with 45 ft. beam, and 18½ ft. draught, and her trial speed was 10½ knots. Her owners are the Anglo-Saxon Petroleum Co. of London.

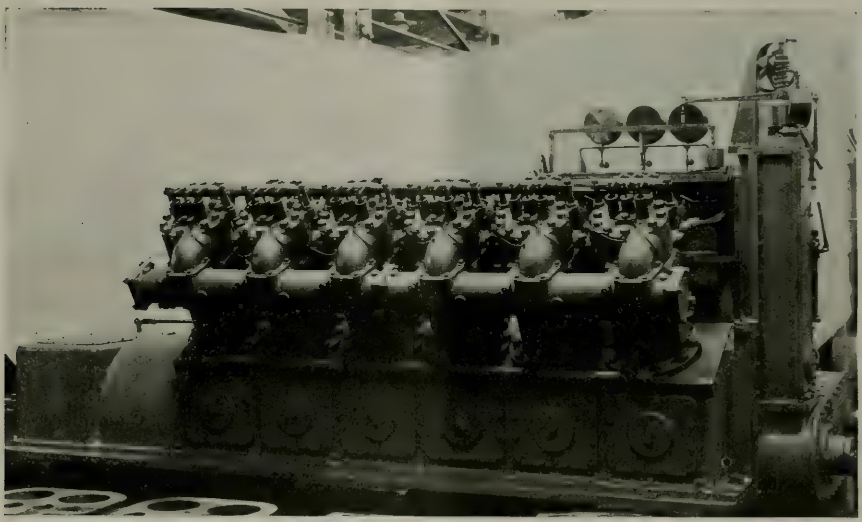
It may be remembered that with the old design of Werkspoor-Diesel engines were not considered to have enough space between the valves for cooling purposes, and about a year ago a new cylinder design was produced in which there is at least four inches of cooling water between every valve, and this was found to be so faultless that the builders were not contented with adopting it for new engines, but fitted the new design of cylinder to some of the older vessels in service. The "Juno" was one of these ships, and having the new cylinders, new pistons naturally had to be put in to fit, and the opportunity was taken to use the latest design, a section of crank-shaft also being fitted. This was at the beginning of the year, since when the engine has been running splendidly, which goes to prove how necessary is sea-going experience to produce a satisfactory design of marine Diesel engine. Previous to the completion of the "Juno," which was a little over four years ago, Werkspoor had only fitted three small motorships with Diesel engines, the highest of these being 450 b. h. p., so the perfection of the Werkspoor engine of today hardly could be expected. Yet she really has done very well in service, and the performances of this ship will do much to induce shipowners to place orders for motor vessels in a general way.

A V-TYPE DIESEL ENGINE

The Winton Engine Company are constructing V-type, twelve cylinder Diesel engines, this being a development of the V-type automobile motor produced by the same concern. It is worthy of note that the Werkspoor Company built a 1200 horse-power engine of this type for a Dutch gunboat, but in this case the type was adopted on account of lack of head room rather than from choice.

The illustration herewith shows the twin-six engine for the yacht La Bell, owned by Mr. Winton. The cylinders are 7½-inch bore by 9-inch stroke, and the engine develops 300 h. p. at 400 revolutions. The weight is 22,000 pounds, or about 75 pounds per brake horse power, thus securing the same weight in a commercial engine as has been reached in the submarine engines.

The engine is of the four-cycle type, with the customary valves in the cylinder heads, and these are not operated by a cam shaft on a level with the cylinder tops, but from a shaft enclosed in the crank case, the valves being actuated by push rods. Forced lubrication is provided, the oil passing through the crank shaft, which is hollow. A single air compressor is driven from the port side of the engine by a layshaft, which also drives the water, lubricating oil, and fuel pumps. Fuel consumption tests showed a consumption of .42 pounds of fuel per brake horse-power hour. The engine has a length of 11 feet 6 inches, a maximum width of 5 feet, a width of bed plate of 44 inches, the height from center of crank shaft to the top of cylinders is 48 inches, and to the top of the governor 70 inches.



One of a pair of 300 b. h. p. Winton twin-six Diesel engines for the yacht "La Bell." The cylinders are 7½ in. diameter by 9 in. stroke

REVIEWS

The November number of the Bulletin of the Merchants' Association of New York contains two resolutions, namely: "Opposing government ownership and operation of public utilities," and "Advocating exclusive regulation of all railroads by the Federal Government."

The arguments presented on these two questions are clear and conclusive, especially those on the latter question, where the efficiency of the Inter-State Commerce Commission is largely nullified by the separate and variable laws laid down by forty-eight State legislatures. Different train crews are required in different states, different penalties are enforced in different States for car shortages, with the result that the State with the high penalty is served first. The railroad operation laws of the different States conflict at every turn, and every confliction means added expense. Throughout all the arguments the rights and privileges of the general public are recognized as the greatest interest at stake, and the arguments advanced are exceedingly instructive.

"The Design of Marine Engines and Auxiliaries," by Edward M. Bragg, Professor of Naval Architecture and Marine Engineering at the University of Michigan, 180 pages, 110 illustrations, folding plates, etc., $3.00 net, D. Van Nostrand Company, New York.

This volume is a well-arranged treatise on engine design, and, in addition to carefully collected data for which the author claims no originality, contains a new method of design, a new method of obtaining mean bearing loads, a new use of the mean lead in the solution of valve diagrams, and new methods of designing condensers and turning engines.

The sixteenth "Financial and Economic Annual of Japan," issued by the Department of Finance of that country, is one of the best arranged publications of this character that we have ever seen. The tables are simply arranged, and the color plates showing taxes, expenditure, imports, exports, etc., show graphically the present condition of Japan financially and industrially. That the national debt of Japan has decreased over 150,000,000 yen since 1911, that she is now enjoying a heavy balance of trade in her favor, and that her bank deposits are swelling rapidly all serve to dissipate the erroneous opinion generally prevalent in this country concerning the financial status of the Island Empire.

Johnson's Steam Vessels of the Atlantic Coast, $5.00 net, Eads Johnson Publishing Company, 30 Church Street, New York.

The object of this volume is to furnish a ready reference for all vessels owned and operated along the East Coast of the United States. With this end in view four alphabetical lists have been arranged; first, a list of owners; second, a list of vessels with their owners; third, a list of former names of vessels and their present ones, i.e., a list of all vessels that have had their names changed, and fourth, a list of companies and owners with their fleets in detail. The volume is bound in flexible leather and is of a size suitable to slip in one's pocket. Altogether Johnson's Steam Vessels of the Atlantic Coast is an exceedingly well arranged ready reference book.

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J. S. HINES . . . . Managing Owner
F. M. DICKIE . . . . Editor
R. E. HANLY . . . . . Advertising Manager
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THE NEW YEAR'S OUTLOOK.

Nineteen Hundred and Seventeen promises to be the banner year in the entire history of American shipbuilding and the unprecedented activity in the construction and operating of vessels is being reflected through the thousand and one industries whose existence is wrapped up wholly or in part in the use our nation makes of the sea.

There is nothing niggardly about the friendship of the sea; to those peoples who have understood her she has yielded a hundred fold. She has pointed the way to the attainment of great wealth and power to those who have intelligently sought and this she has done without thought of injury or malice to those who have turned a deaf ear to her blandishments.

Americans are turning once more to the sea. Already they are casting covetous eyes on their old time heritage. Commercialism is calling them, but it is a commercialism that is softened and chastened by the mysticism and romance of the great deep. It is a commercialism that possesses a soul.

The Pacific Marine Review has played its little part in fanning the fires of American determination to once more go forth and wrest a new and crowning glory from the sea. The response to our efforts has been hearty and whole souled and the support we have received in the past coupled with the belief that this support will continue to be ours, has enabled the Pacific Marine Review to bid its friends a Happy New Year in a new suit of clothes. It will be our endeavor to make Nineteen Hundred and Seventeen a year of achievment. With an enlarged magazine, new type faces and a better systematization of our news and service departments we hope to fully please our rapidly widening circle of readers and our most ardent wish is that the vision of promise which Nineteen Hundred and Seventeen holds forth for us will be transfused into fulfillment of the New Year's hopes of each and every one of you.

THE SHIPBUILDING OUTLOOK

THERE is naturally two distinct viewpoints to consider in viewing the present condition of shipbuilding in the United States. The abnormal demand for tonnage, coupled with the flooding of the steel companies with orders, has caused both the contract price of shipping and the cost of producing it to soar to a point where all comparison with normal figures becomes useless. Owing to the fluctuation of material prices and the uncertainty of deliveries on many articles of a vessel's equipment, builders today cannot figure very closely the actual cost of a ship, and their prices are based to a considerable degree on the law of supply and demand.

The natural question that is being asked just now is: What will be the chances of the United States to become a rival of European countries as a shipbuilding nation? A great deal has been heard of late relative to the "standardized ship." Now, whatever may be meant by that term, whether we take it as meaning a standardized set of dimensions and lines for a limited number of classes of freighters and tankers or a standardization of the structural material itself, such standardization can have little effect upon the ultimate cost of construction here and abroad for the very simple reason that what can be standardized here can be standardized anywhere else. The gain to be looked for through any lessened cost secured through standardization is that by lessening the first cost of a ship the "fixed charges" borne by her operators are lessened.

Since the standardizing of ships cannot effect the relative cost of ship production between this country and any other maritime nation, there remains but two important items to consider, the cost of labor and the cost of materials, both for hull and equipment.

Even when the possibilities of commercial warfare following the present appeal to arms are considered, it is highly doubtful if wages either in Great Britain or Germany will ever recede to the levels obtaining before the war. At the same time the American level or shipyard wages is raising, but it is safe to assume that the relative wages between the U. S. industry and that of Great Britain and Continental Europe will not present such a great percentage of difference as they did thirty months ago. The change occurring in the relative rate of wage will be by far the most important factor in determining whether the United States will be able to construct ships in competition with British and European yards.

The cost of steel will probably be somewhat in favor of the American plants since American shapes and plates had reached as low a base price as the British steel before the war. Another factor in favor of the American yards will be that they will be operating continuously at full or nearly full capacity. In the past even the most fortunate yards alternated with dull and busy seasons, a condition very conducive to high overhead costs. The present rush of new orders will probably last for several years, irrespective of the termination of war in Europe, and during this period the American yards should have become strongly entrenched financially, and while boom times are not highly conducive to a close study of economies in ship construction, the machine equipment and organization of our yards should be found in splendid condition to meet the return of competition.

American Deep Sea Ships

By R. E. CROPLEY

IT is time we Americans ceased imagining ourselves to be a great World Power, for by so doing we but make ourselves ridiculous to the other nations of the world, who marvel at the way we remain blind to the international situation forced upon us—blind to a clear-sighted policy of industrial and military preparedness as a means of preventing war and the shedding of either our blood or that of our children.

Yes, other people see us as we really are, and sometimes are kind enough to hold up the mirror. But usually, as our ridiculousness is to their gain, they are simply amused by the queer things we do—things like the passing of the Hay Bill to federalize the National Guard (an act of foolishness, we now see ourselves)—amused at our appropriating over $300,000,000 for a navy we cannot build at the moment because our ship yards are jammed with construction mainly of Standard Oil tankers or merchant vessels of far-sighted Scandinavians—amused, and justly so, that we have the effrontery to believe the prosperity we now enjoy is trade on a solid basis that will endure.

Every so often we get an eye-opener like the "U-53," but the trouble is that the United States never takes its lesson deep to heart. There is no wonder the country panicked over the exploits of the "U-53," seeing that she struck at the very pillars of our present prosperity—prosperity rather than bankruptcy because we are the commissariat of belligerents while our usual oversea trade suffers from lack of ships to carry what few goods South America and other lands buy from us, because we have a tariff wall which prohibits their paying us in goods.

There's an old law in the Bible, called "Barter." It holds good today. Exports are paid for by imports. Unless we take South America's goods in payment she cannot deal with us to any great extent, because to pay us South America must get gold from Europe, and Europe is not going to pay South America gold for her products in order that she may pay us for goods which she can obtain just as well from Europe.

Recently, in speaking of our tariff, Dr. Eliot of Harvard said:

> Protection is beginning to have for the majority of Americans the ugly aspect of an unfriendly, keep-out, touch-me-not, charity-begins-at-home policy, while Free Trade seems to be a mutual-benefit, love-thy-neighbor, peace-promoting policy. Great Britain has been the great exemplar of the advantages of unrestricted trade, and has profited enormously by her stout adherence to that practice.

And it may be added that it is the principal of Free Trade which gives England the industrial and financial strength to cope with her present extremity.

We are constantly being told that when this war is over American manufacturers will be swamped before the active competition resulting from the resumption of foreign production, which will create a situation the United States cannot meet without a sensible use of the protecting power of the Government. The sooner the American mind is divested of the idea that these tariff duties, elastic or otherwise, will play a large part in the commercial reconstruction of the world, the better it will be for our chance of continued prosperity. For the emergency is largely imaginary. Yet if it were undeniably real, it assuredly could not be met by any legislative program of which the "protective" principle is the basis and informing spirit.

Surely if there is to be renewed activity in the United States in producing articles to meet the demands of peace, we must have a market for them outside the country as well as in it. The exhausted

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European nations are not going to pour a great surplus upon us as soon as they are through fighting, any more than they are going to keep up a large demand for our products. We shall still need an outlet and all the foreign trade we can get. We shall need to sell abroad all we can, and shall have no difficulty in supplying the home market so far as our own products are concerned. And to get this needed market—a more intelligent interest in industrial organization does not involve the dislocation of trade relations with other nations or the closing of our ports against them.

Even if South America should become one of our permanent customers for the kind of goods she has been purchasing since the European War began, we could not do business with her, for we could not deliver our goods. We haven't the ships—the delivery wagons. We are in the predicament Wanamaker would be in if Macy owned the delivery wagons and Wanamaker had to use them. The two stores being of the same type, surely Macy in his own wagons would not deliver Wanamaker's goods to Macy's own customers ahead of Macy's own goods. The simile is that both England and Germany are large industrial nations like the United States. Their customers are our customers, but England and Germany have large merchant marines—the delivery wagons of the world.

Because of delivery, just recently an American manufacturer of cast iron pipes failed to get a contract with the City of Buenos Aires, even though the cost of producing his goods was less than what it cost his British rival. He lost out because the South American city had insisted the bids should be f. o. b. Buenos Aires, and the high freight rates from New York to Buenos Aires, due to the withdrawl of all German ships and over half of the British, for Admiralty purposes, made the final cost of the American goods much greater than the British. Such a state of affairs would not have existed if we had not been playing politics with shipping for fifty years.

No wonder foreign nations are not only amused but thankful we won't see ourselves as the fools they believe us to be by allowing to slip away the prize of permanent possession of the world's trade and have turned to grasp the bauble of war contracts which a single U-boat can burst like a toy balloon.

I speak of the commercial side of the Merchant Marine, first, because a nation is inclined to legislate in tune with its pocketbook, and only through the money making instinct of the American people will we get a backbone for our navy. And, as a backbone for the navy is the most essential reason why the United States should have a large merchant marine. For no matter how fine our fleet may be, it is utterly useless in time of war unless it is backed up by merchant ships to coal and feed it and enable it to keep the high seas. Because of a lack of foresight, when the Spanish War came upon us, in 1898, we had to pay dearly for the poorest collection of floating wrecks that were ever corraled. We had to have them for transports, supply ships, colliers and other auxiliaries necessary to a well-balanced navy. And that we got them at all was only because Spain was not powerful enough to insist on strict neutrality from the neutral nations.

Yet, in spite of our costly experience of 1898, ten years later the United States could not provide a sufficient consort to coal and feed our sixteen battleships dramtically encircling the globe. English, German and Italian vessels were chartered to serve the fleet. Supposing the European catastrophe of August, 1914, had come while our fleet was visiting Australia, where, as it was, great difficulty was encountered in the matter of obtaining coal! Our warships would have simply had to rot in Australia's hospitable waters till we built colliers and supply ships to go out and "mother" them home. As the cruise was ostensiously a warning to Japan of our mythical preparedness, if shot had actually been exchanged the lack of merchant ship "mothers" would have so handicapped the operations of the fleet that it would have stood an excellent chance of a glorious defeat.

In 1898 and 1908 we realized what a frightful and costly mistake it was not to fortify ourselves with a merchant marine auxiliary to our navy. Nothing was ever so manifest. The whole country

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on those two occasions rang with cries of protest and amazement. Yet today finds us just as badly off.

What is wrong with us? Can't we realize that as a nation we are an orphan and must fight our own battles in international life? Don't we see that we are committed to the use of the seas which are our boundaries by all the factors in the scheme of civilization—committed geographically, politically, commercially, socially and by military necessities and the instinct of self-preservation? Why do we so easily forget our lessons? Is the answer, war is not a nation's worse evil but too much prosperity is?

England, much to her sorrow, failed to heed Lord Roberts' warning of the German menace and prepare herself for war. We, in turn, fail to pay any attention whatsoever to the words of Admiral Mahan, the ablest naval writer of modern days, who, in discussing our future naval power, said:

> "Can this navy be had without restoring the merchant shipping? It is doubtful. History has proved that such a purely military sea power can be built up by a despot as one was done by Louis XIV: but experience showed that his navy was like a growth which having no root soon withers away."

What a commentary on the American naval policy of the last fifty years!

Look at our Spanish War from the army side. Thousands of our troops were mobilized at Tampa, Florida, and for months were compelled to suffer fevers and malaria because we had no merchant ships in which to transport them the few hundred miles to Cuba. Many of the regiments never even left Tampa, as the war was over before they could be moved.

And in the Huerta War of 1914, it was our battle fleet which had to be used as transports, and it was our sailors who seized Vera Cruz, because through lack of American merchant ships an army could not be gotten to Vera Cruz in time.

It matters not how powerful a fighting fleet may be, its operations are limited to coast defense unless it is backed up by transports carrying provisions, ammunition and supplies of every character. Our tiny Asiatic squadron in times of peace uses four hundred tons of coal a day, which must be brought thousands of miles over land and sea.

To be efficient in times of war our present navy needs the backing up of over four hundred auxiliary merchant ships—mainly big, pot-bellied cargo craft, and a few express liners for armed scouts—ships to do the real, hard, dirty work of war, as has been proven by the wonderful efficiency of the British merchant marine the past two years in performing deeds we have heard but little about, yet have been as essential to England's command of the seas as is the gasolene to the automobile.

If we used Old Dominion liners, Clyde, Ward, Savannah and other coastwise ships, we could hardly muster half of the necessary four hundred, and in the bargain would have a lot of vessels totally unsuited for the work of enabling our navy to keep the high seas. For, primarily, what we have in the merchant ship line, except in the case of the vessels of the American-Hawaiian Steamship Co., and about twenty-five other individual cases, is not heavy enough constructively to stand the wear and tear of war, and of too small tonnage to be of any great strategic value.

It is true we have a few Government transports purchased in 1898, but most of them are over twenty-five years old—one forty-two, and the efficient life of a ship is but twenty years.

In his recent book, "The Heritage of Tyre," William Brown Meloney says:

> The transports that were purchased in 1898 should have been scraped long ago. If a private concern owned them they would have been. It is boasted by the Government that in 1914 these vessels saved $300,000 over what it would have cost to perform the same service by patronizing private American ships. But Britain makes no such boast. She employs her merchant marine to do her trooping and her carrying and her colliering, between her occasions the commerce of the earth maintains them.
>
> We (U. S. A.) need scouts and troopers and colliers. To obtain "Maurentanias" and "Aquitanias" the United States must

> be prepared to pay as Britain has paid, calling the price by any name one will—subsidy, subvention, grant or bounty, but paying it. To have troopers and colliers the United States must make it possible for them to live in their respective trades of peace against the day it shall suddenly need them. We must be willing to make any sacrifice.

Yet we make the sacrifice by passing the La Follette Seamen's Bill, which when peace rules the earth once more will force what few deep sea ships there are under the American flag—force them to the shelter of foreign registry, in order to live at all, unless the Shipping Board recently created can bring the American people to their senses.

The reason we have not had a decent merchant marine can be laid at the door of both political parties. For in seeking the Labor vote they have engaged in bitter rivalry as to which could accomplish absolutely nothing, and after fifty years of struggle, until the new Ship Bill was passed early in September, 1916, the Democrats, by reason of the La Follette bill, led in the destruction of American hopes and protection on the high seas.

The La Follette Bill was created, I believe, primarily to improve the living and working conditions of labor on shipboard. And in this respect it is justified. Shipowners, especially English liners, should have made the changes long ago, and labor cannot be blamed for trying to secure decent legislation in this respect. But, like all class legislation, Labor goes too far, resulting in the La Follette Bill, containing features making it unprofitable to operate vessels under the American flag in normal times. Consequently the bill should be condemned as a vicious piece of legislation, dangerous to the national security of the American nation.

The one ray of light in the whole tragic situation is the creation of the Shipping Board in the new Ship Bill, with the great possibility of taking the revision of our shipping rules and regulations out of the melee of politics. Based on the excellent British Board of Trade—a commission more essential to the British nation than the King himself—our new Shipping Board is one of the most necessary things to assure the welfare and national defense of the United States. For it will serve materially the policy of developing American shipping in the world's trade, and if intelligently directed will elevate and strengthen the country as a factor in that trade in competition with other nations.

It also ought to make us more potent and influential in our general international relations, certainly for the promotion of peace and progress in civilization. And to get this board those of us who have the welfare of the nation so at heart have had to stand for the utter foolishness of many sections of the new Ship Bill in order to obtain a beginning, even though as a whole the bill is not what it should be.

All public support should be given in order that the Board may successfully assist American vessels to earn their "salt," obtain a backbone for our navy and improve the credit and respect which we enjoy so infinitesimally at the moment in our foreign relations. We must give the Board our unstinted support, for without the unpleasantness of criticism it is going to have great difficulty living down the fact it is tagged with $50,000,000 for possible Government ownership of merchant vessels, which is not wanted; it is going to try and bring the warring elements in shipping to the point where they will stop calling each other names and recognize the other fellow's case.

By our support we must enable the Board to sound a call that will draw Americans back to the sea. Instead of our country boys going to the already overcrowded cities, careers in the merchant marine should be opened for them, with added opportunity of doing their bit for their country in the Naval Reserve. The four thousand men who are discharged from the navy each year should be enticed into the merchant marine. At the moment we blandly let them throw away their training which in itself is so necessary to a naval reserve, which, from any angle, as England has so concisely proven to herself for generations, is worth every dollar it may cost, and a great deal more.

We cannot any longer afford to remain blind to the international position the "U-53" has forced upon us, and hope to survive as the power we like to imagine ourselves to be. We must have our merchant marine for trade as well as naval purposes, otherwise stand to shed either our blood or that of our children and pay the penalty for our blindness by our shores being visited by the horrors of war.

The Pacific Mail Steamship Company recently registered their house flag and funnel mark. The house flag is swallow-tailed, divided longitudinally into five stripes—the two outer ones red, adjacent stripes white, and center one blue. The funnels will be yellow with a black band at the top with a white band under.

It is understood that Vancouver, British Columbia, is to have a large floating dry dock within a year's time. The concern will be known as the Vancouver Dry Docks, Ltd., and will be headed by Charles Meek of that city. The dock contemplated is of 16,000 tons capacity.

Work on the new Ames Shipbuilding and Dry Dock Company is progressing steadily, and the new firm hopes to lay its first keel some time during January.

Mainly About People

A. Foster Higgins, a partner in the firm of Johnson and Higgins, one of the best known insurance brokerage firm in the United States, died on November 28th, at his home in Greenwich, Conn., in his eighty-sixth year. Mr. Higgins came prominently before the business world when the late J. P. Morgan and Samuel Babcock employed him to reorganize the United States Lloyds. Mr. Higgins was a financier of great ability and in 1907 he was selected to save the Knickerbocker Trust Company.

Mr. James Donald has returned to the United States in the capacity of Vice-President and General Manager of the States Marine and Commercial Company, American representatives of Messrs. Leopold Walford, Ltd., an old London firm of managing owners, shipbrokers, forwarding agents and merchants. Mr. Donald was brought up in the shipbuilding industry, being with the Fairfield Shipbuilding Company for a good many years, ultimately becoming Dr. Elgar's assistant. From 1896 to 1901 Mr. Donald was with the Union Iron Works at San Francisco and left here to become Naval Architect for the newly formed New York Shipbuilding Company. In 1908 he left the Camden concern to open offices in London, coming again to America in connection with the building of the "Rivadavia" and "Moreno" for the Argentine Republic. Mr. Donald was well known in San Francisco, and his return to this country will interest many of our readers.

Mr. S. E. Allbin, chief engineer of the H. W. Sumner Company, Seattle, spent the early part of December in San Francisco and vicinity. Mr. Allbin reported that the recent shop tests of the new oil engine being perfected by the Sumner Company had proven very successful, and that this engine will probably be definitely in the marine oil engine field before long.

George Walker, formerly with C. P. Doe, has been appointed general manager of the Fair and Moran Company.

Mr. Jack Rea, formerly chief clerk for Fair and Moran, has been given the Los Angeles agency for that concern.

George F. Fuller, U. S. Inspector of Boilers in Portland, Oregon, for over eighteen years, died in that city on December 5.

Mr. George Flood, managing director of the Russia-Japan-American syndicate, sailed from San Francisco for the Orient on the "Shinyo Maru," December 8. Mr. Flood will spend several months in Japan and Russia, establishing connections for his firm.

Mr. Meyer Davis, formerly chief engineer, has been appointed manager of the San Francisco office of the Asbestos Protected Metal Company, with headquarters in the Hobart Building.

Mr. C. A. McMasters, for the past six years treasurer of the Alaska Steamship Company, has resigned to become president and managing director of the Washington Shipbuilding Company.

Mr. R. R. Fox, manager of the Simonds Manufacturing Company, and secretary of the Washington Shipping Corporation, has returned to Seattle after a month spent among the Eastern shipbuilding yards. Mr. Fox predicts an even greater rush of orders for the wooden shipbuilders of the Pacific Coast.

Mr. James L. McLean, Vice-President of the Inter-Island Steam Navigation Company, and one of the best known shipping men in the islands, died in Honolulu on December 5.

Mr. Geo. M. Cornwall, publisher of the "Timberman," a well known Pacific Coast Magazine, and an authority on the lumber trade, was a visitor to San Francisco during the early part of December.

Mr. James A. Kennedy, President of the Inter-Island Steam Navigation Co., visited San Francisco in December.

The Terry Steam Turbine Company of Hartford, Conn., have announced the appointment of Stephenson and Nichols, with offices in the Monadnock Building, San Francisco, as their representatives in Northern and Central California and Northern Nevada.

Fair and Moran, a well known San Francisco shipping firm, who have been occupying temporary quarters on the fifth floor of the Fife Building, will move shortly to larger quarters on the eighth floor of the same building.

The Charles R. McCormick Company, which has been occupying restricted quarters on the fifth floor of the Fife Building, while that structure has had four floors added, will now occupy the entire ninth floor.

Mr. A. H. Ginman, for several years superintendent of the Pacific Coast Division of the Marconi Wireless Company, has retired from the service. The Coast management will now be divided between three departments. Mr. W. A. Winterbotham, who comes from the New York office, will have charge of the transoceanic service; Mr. E. T. Stevens, from Baltimore, will head the marine department, and Mr. H. Barth, from New York, will be division engineer. Mr. Ginman entered the Marconi Company in 1900, making the first trans-Atlantic trip as operator on the "Lucania."

Captain E. F. Allen, from Sydney, Australia, passed through San Francisco a few weeks ago on his way to the Government Naval Station at Pago Pago.

Mr. E. W. Horsman has been appointed assistant superintendent of the Pacific Coast division of the marine service of the Marconi Company.

Mr. V. S. Jenkins, of Seattle, member of the firm of Stadfelt and Jenkins, has been appointed northern representative of Mr. Dan E. Ford.

The "Dauntless" of the Red Stack tug fleet has been sold to the Luckenbach Steamship Company. The "Dauntless" will be transferred to the Atlantic Coast.

Dodwell and Company will handle the Border Line Transportation Company's new San Francisco service which was opened with the sailing of the "Despatch" from this port December 26.

G. L. Blair of the San Francisco and Portland Steamship Company, spent the latter part of December in Seattle, his mission being the securing of another vessel for the San Francisco-San Diego-Seattle run.

W. J. Byrnes and Company, a well known San Francisco firm of custom house brokers, chartered the Japanese freighter, "Fukui Maru," and placed her on the berth for Yokohama and Kobe the middle of last month.

Mr. Henry Lund Sr., for more than thirty years Norwegian Consul at San Francisco, head of the well known firm of Henry Lund and Company, who were the pioneer movers in introducing heavy oil engines on this Coast, has been made a life member of the Scandanavian Society. A delegation from the society recently presented Mr. Lund with an engaved silver plate, making him a life member in the society which he had taken a prominent part in founding. The Scandanavian Society was founded in 1859 by Mr. Lund, two other Norwegians, three Swedes and three Danes. Mr. Lund is the sole survivor of the nine original members.

In order that he might give his entire time to the management and upbuilding of the American Bureau of Shipping, Mr. Stevenson Taylor has disposed of his interest in the Quintard Iron Works and resigned his directorate in that concern, as well as from being a director of the Alberger Pump and Condenser Company.

Mr. Joseph E. Sheedy, since 1912 Marine Superintendent for the Inter-Island Steam Navigation Company, with headquarters at Honolulu, has resigned this position, and left Honolulu for Seattle on December 8. It is understood that Mr. William McKay, who represented the Inter-Island Company at Hilo, will succeed Mr. Sheedy.

Freight Report

By PAGE BROTHERS

OUR last circular was dated November 20th. From San Francisco, no new tonnage has been taken up, that is, for grain to Europe, nor has there been any tonnage chartered for same country from the North, although it is rumored that the British Admiralty, which had reported they would load the steamer "Don Benito" with lumber and ties for U. K., may now load a cargo of wheat from Portland to England instead.

The Time Charter freight market has shown more activity both in foreign and coast owned tonnage, Andrew Weir & Co. having chartered the new steamers "Hanna Nielsen," "Capto" and "Talabot" for delivery at the port of building, redelivery there; the first two for six months, and the last one for twelve months. These steamers are allowed to go anywhere that their insurance policies permit with the exception of Europe.

The Osaka Shosen Kaisha, about a fort-night previous to the above mentioned, chartered an 8200 tonner, Japanese, delivery and redelivery Japan, trans-Pacific trading, for one year at 15½ yen. A few days previous, a smaller Japanese steamer had been chartered, also for a year, by Japanese charterers at 15 yen, and since Andrew Weir & Co. chartered the Norweigian steamers, another Japanese vessel of about 8000 tons has been chartered, also in Japan, for general trading at 17 yen, and we may say the market is fairly firm at these prices.

Steamer "Thorbjorn," ex "George W. Fenwick," was chartered for $34,000 per month time charter, delivery Balboa and redelivery West Indies for sugar trade. W. R. Grace & Co., in turn, chartered her to load a cargo of lumber from Puget Sound to Balboa on private terms, and they also chartered steamer "Speedwell" for a trip to Balboa at $16.00 per thousand.

Norwegian steamer "Fiff," ex "Edgar H. Vance," we understand will proceed from here to Balboa in ballast, where she will be delivered to West Indies charterers who have taken her for about six months for the sugar trade at from $38,000 to $39,000 per month on time.

Comyn, Mackall & Co., who had chartered "Katherine" for coal from Newcastle to a nitrate port at about 50/-, were lucky enough, under their charter, to have the privilege of cancelling after a certain number of days if vessel delayed by strikes. They did cancel the coal charter, and made a charter instead from Sydney to Callao with a full cargo of wheat at 75/- per ton, which, of course, will show a much handsomer profit. With the exception of the "Snow & Burgess" chartered for this port, the British Admiralty has not allowed any more wheat charters in this direction. Hind, Rolph & Co. chartered "Hawaii" and "Golden Gate," both sailers, from a nitrate port to Puget Sound at $14.00 per ton.

Business to the Orient has not been so lively since we last wrote. Mitsui & Co. have berthed the steamer "Meiten Maru" from San Francisco to Kobe and Yokohama with a cargo, principally of cotton and steel, and the Oriental Trading Co. of Seattle, chartered the steamer "Fukui Maru" from this coast to Japan, but being right on the spot, which did not give them proper time to assemble the cargo, they chartered her to load a cargo of coal from Nanaimo to San Francisco at $3.00 per ton of 2240 lbs., free of stevedoring at both ends, to the Western Fuel Co. They then put their vessel on the berth from San Francisco to Kobe and Yokohama, and the berthing was put into the hands of W. J. Byrnes & Co., who were successful in getting full cargoes for her at regular rates although this was their first experience in this line.

Lumber freights are steady, though slightly easier in rates, the "Wilbert L. Smith" and "Willis A. Holden" both being reported fixed from Puget Sound to Callao at $29.00 per thousand, as against $30.00 and $31.00 a month ago, and the "Puerto Montt" reported chartered at 105/- per thousand, which is even a lower price.

No lumber charters to Australia have been reported lately, and rates are practically the same as quoted in our last circular, the only charters reported being the "Lewis A. Goni" with case oil from San Francisco to Sydney loaded by the Standard Oil Co., at about 80c per case, and schooners "Commerce" and "Lucy" chartered from this port to Tahiti by Geo. A. Moore & Co. on private terms.

The China Import & Export Lumber Co. are reported to have chartered one or two motor boats from the North to Shanghai at $25.00 per thousand. The Ocean Lumber Co. have just chartered "Wm. Nottingham" from Puget Sound to Durban and Delagoa Bay at 250/-. Comyn, Mackall & Co. have sold a cargo by their own vessel, the "Jane L. Stanford," from San Francisco and British Columbia to a direct port in Africa, and Hind, Rolph & Co. are sending the "Ariel" and "Matthew Turner" with lumber to Africa to fill sales made by them. We should say these sales were no doubt based on about 225/- to 240/- per thousand, freight.

The buying market has again revived. The Pacific Coast S. S. Co. reported to have bought the "Northland" and also the "Grace Dollar" for their business, and Parr-McCormick S. S. Co. are said to have bought the "Speedwell" on private terms, and resold her at about $145,000 to $150,000 to the former Cincinnati owners of the "Willapa," which was lost in the Gulf of Mexico a short while ago. James Griffith & Co. of Seattle, have bought the "British Columbia" at about $95,000. Steamer "California," ex "Aloga," was chartered by John A. Hooper to parties in New York for one year from this month, trans-Atlantic trade, on time charter, at $105,000 per month, and we hear, from the best authority, that she has been sold, also in New York, at $1,500,000, the new buyers taking over the charter we have just mentioned. So ends, as far as this coast is concerned, the history of the "Aloga." The enterprise of Mr. Hooper and his friends was certainly well rewarded, and so, also, with the steamer "Republic," which they lifted from the depths of a Coral Isle harbor.

Mr. Andrew Mahony has been successful in selling his new motor boats now under construction, the "Rose Mahony" and "Andrew Mahony," for about $275,000 each to the Standard Oil Co., but we understand that the seller undertakes to put in a shelter deck in vessels, and the latter have also bought from the Rolph Navigation & Coal Co., the American ships "John Ena" at $375,000 and the "Dunsyre" at $250,000. These two vessels were bought one year ago by Mr. Rolph at $180,000 and $143,500, respectively, which makes an exceedingly neat turn, so that many are talking of the Mayor's "luck." They forget that there is also such a word as "pluck," and he certainly has shown a great deal of this latter quality in the matter of building and buying vessels.

The Robert Dollar Co. have also made a good turn on the little "Yucatan" which they have not possessed for more than two or three months. She is now owned by Japanese parties.

Take it all in all, this has been the most remarkable year on this coast because of the magnitude of the transactions and the construction of vessels. From having no building plants, with the old established firms of the Union Iron Works and Moore & Scott, the whole coast from British Columbia down to San Pedro has more orders to fill in the matter of construction, than they can attend to, which has been a Godsend to labor, and a great help to the whole community.

We wish our readers the compliments of the season, and sincerely hope that the entering wedge has been started that will end the war in the next two or three months at the latest.

Shipping Notes

A thirty-six years' concession has been granted for the operation of two floating dry docks in Valparaiso Harbor. The concession requires that the docks will be of at least 12,000 tons capacity.

The Baltimore and Ohio Railroad and a group of South American capitalists have entered upon negotiations with the view of establishing a $15,000,000 steamship company, to operate a line between Baltimore and South American ports.

The new oil storage station of the Union Oil Company at Valparaiso is now in operation. This gives the Union people oil stations at Tocopilla, Taltal, Antofagasta, Iqueque and Valparaiso.

The large increases in both the tourist and freight business promised for the 1917 season has caused the officials of the White Pass and Yukon route to order two new steamers. One will be a stern wheel river craft, 165 feet long by 35 feet beam, with sleeping accommodations for eighty passengers. This boat will be operated on the Caribou-Taku run. The other will be a twin-screw dayboat, 90 feet long by 18 feet beam, and will be operated on the Lake Atlin section of the White Pass and Yukon's great summer tour route.

SEATTLE

The Washington Overseas Shipbuilding Construction Company has started operations at its Aberdeen plant and the keel of the first of seven wooden-hull, reinforced-construction, five-masted, bald-headed schooners equipped with twin screw Bolinder engined auxiliary drive, has been laid. The vessels contracted for run from 250 to 290 feet in length.

Frank Waterhouse and Company have renewed charters for six months on three big Japanese freighters, the "Bankoku Maru," "Saikai Maru" and "Gishun Maru." These vessels are of 10,000, 6000 and 6500 tons d. w. capacity, respectively.

The Washington Shipping Corporation laid the keel for the fourth wooden hull on December 11. The first of the four ships now under way was launched late in the month, and the others will follow at intervals of about thirty days. It is understood that the demand for these vessels is so brisk that new keels will be laid as fast as the building ways are vacated.

The Alaska-Pacific Navigation Company are to launch a big wooden auxiliary during the present month.

The Cauto, built to the order of the New York & Cuba Mail Line by the Seattle Construction and Dry Dock Company, was turned over to her charterers, Williams, Dimond and Company, after a successful trial trip on December 9. The vessel will be turned over to her owners on her arrival at New York.

Lee and Brinton, naval architects, Seattle, are preparing plans and specifications for a handsome raised deck cruiser for H. W. Starrett. The craft will be powered with an 80 h. p. Imperial engine.

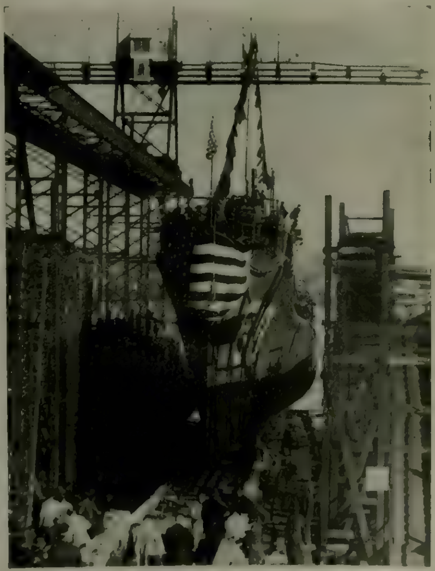
Mr. Humphrey has introduced a bill in the House of Representatives calling for an appropriation of $3,500,000 for the construction of a large graving dock at the Puget Sound Navy Yard.

PORTLAND

Mr. A. H. Averill has been appointed as a member of the Portland Dock Commission, to succeed Mr. Dan Kellaher. Mr. Averill has been in the machinery business in Portland since 1890, and was twice elected President of the Portland Chamber of Commerce.

The Peninsula Shipbuilding Company launched its first big auxiliary schooner, the "Alpha," on December 8.

Work on the third of the four building ways at the Standifer-Clarkson Shipbuilding Company's North Portland yard is just about completed. The motorship for Libby, McNeill and Libby is rather more than half completed. The building berths as fast as they are completed will be occupied by 3600 ton d. w. auxiliary vessels, built to Standifer and Clarkson's order for the market.



A bow view of the torpedoboat destroyer "Shaw" sliding down the ways at Mare Island.

The Submarine "H-3" on the beach near Eureka, California. This craft has figured in several mishaps.

The Albina Engine and Machine Works has secured the contract for overhauling the "Manzanita." The Government Lighthouse Tender, however, will not be laid off probably until about the first of the year.

The shipbuilding industry, Portland's biggest enterprise at present, is threatened with its first real crisis.

Ultimatums ordering the adoption of closed shop policies in all yards effective February 1, 1917, have been served on all employers. This was backed up by a strike vote taken and recorded by the unions immediately, contingent of course upon the acceptance of the closed shop policy.

The fight is being directed by the unions along two distinct lines. The National and International organizations of craft working in the metal trades are conducting one and the caulkers working in the wooden shipbuilding end are conducting another.

The employers are presenting a firm front against this attack. They have appealed to the people of the city for support in their fight for the open shop. It is around that condition largely that the fight is being made although slight advances in pay are asked by the men as well.

"We have an infant industry just beginning to make its way without wobbling," declared B. C. Ball, president of the Willamette Iron & Steel Works. We face certain natural handicaps owing to our geographical location which we must offset. We are paying wages commensurate with ability. We have voluntarily increased these wages. We have voluntarily cut the working day to eight hours in all our plants.

"We believe in an open shop policy. We believe it only right that any man shall have the privilege of working for us as long as he delivers the goods and that we are to be the judges of when and how he shall work.

"We know that if these conditions remain we can exist and make a fair profit for ourselves and the people of Portland who cannot help but share with us as our industry grows."

Public opinion has been aroused as never before over a labor crisis. The strike ultimatum and vote follows shortly upon the announcement by a leading vendor of electric power that there are practically no empty houses in the city for the first time since the slump hit the lumber industry five or more years ago.

This summer and fall for the first time in many years jobs have sought the man and the man not the job. For the first time in ten years there is no need of free lodging and eating houses for the idle and poverty-stricken who throng a city during the winter.

The shipbuilding industry alone is responsible for this condition assert business men. The three big steel yards and their allied shops, working under sub-contracts, are providing work for 7,500 men. The wooden shipyards from Astoria to South Portland are working 2,500 more. Fully seventy per cent of these men get a wage of $4 a day or better, it is asserted.

The conditions demanded by the unions have been refused by the employers in total and unless changes occur, the strike seems inevitable.

SHIPBUILDING NOTES

Building of two new steel plants, the Columbia River Shipbuilding Corporation and the Albina Engine and Machine Works, is progressing rapidly and each plant will be laying keels shortly after the first of the year. The Columbia River has six 8800 steel steamers contracted through the Northwest Steel Co., and Hannevig & Johnson, while the Cornfoot plant has six smaller craft taken through A. O. Andersen & Co.

Capt. Alley of the motorship "June" has written to E. J. Davidson, Portland manager for Fairbanks, Morse & Co., installers of the engines in the ship, that she more than lived up to expectations in her 28-day trip from Astoria to Balboa.

Launchings will be the order after January 1. The second McEachern craft at Astoria will leave the ways early in January, the S. I. Allard, building at St. Helens, shortly afterward. The Latourell, the second Wilson ship at Astoria, is also to be launched early in the year.

Capt. T. J. Macgenn, veteran of many years of Pacific Coast service has left the sea.

In doing so the muse, which has been with him all these years inspired him to this last poem to the sturdy craft with which he made such an enviable reputation as a bar pilot. Not in all the 15 years Macgenn piloted the Breakwater in and out of Coos Bay and the Columbia River did he have an accident.

A touching incident of the veteran captain's withdrawal from the sea is that when he returned to Portland after leaving the craft at San Francisco, he methodically registered at a hotel, "Capt. Macgenn, Breakwater," before he realized his mistake. When he wrote in the words "Coos Bay" and scratched out the name of his ship.

The poem follows:

You're a liner, and one in a million,
  As a barboat you never were beat.
You led the procession in Winter
  Or steamed past the whole bar-bound fleet.
The crews who were bar-bound have watched you
  From the masthead, and still tell the tale
How you mounted the high-crested breakers
  When the heavens were rent with the gale.

You broke the thick ice in the river
  When only the liners could go;
Never stopped for the breaking Columbia,
  Nor when the fierce storm winds did blow.
Like a seagull you rode on the billows
  In your course to the wide-open sea,
And you seemed to have challenged the ocean
  Like the warship that fought for the free.

You plowed the coast through the rain storm,
  When lightning shot darts through the clouds
And high seas washed over the stem-head,
  And gales whistled hard through the shrouds,
When the sky and the ocean were dreadful,
  Grave danger and death you defied,
Like Neptune, the god of the ocean,
  Majestic, the waves you did ride.

I drove you in all kinds of weather;
  You were a reliable boat;
And though fore and aft I oft drenched you.
  I always have kept you afloat.
The bars never dented your bottom,
  No rock ever glanced on your keel,
And now we are parted forever—
  For you fond affection I feel.

We've traveled a long time together,
  In storm, sunny weather and fog,
And I gave you the best care I knew how,
  With judgment, the lead and the log.
Though friendship should die at the grave-side.
  There are times when the best friends must part.
So farewell, great queen of the bar-boats,
  You will e'er hold a place in my heart.

Considerable ship stock and long timbers are being shipped overland from Portland to Georgia shipyards.

The Vulcan Iron Works for many years engaged in ship repair work, has sold its plant bodily to the Pacific-American Fisheries of Bellingham, Washington. It is being moved north.

Standifer-Clarkson Shipbuilding Co. are to build two more motorships on speculation according to announcement. They have a motorship for Libby, McNeil & Libby and one for the Maid of Douglas Steamship Co. on the ways now.

H. C. Halling, supervising marine engineer for A. O. Andersen & Co., has arrived from Copenhagen to supervise the extensive shipbuilding contracts of that firm on the Columbia River.

The Columbia Engineering Works sent A. M. Mears to New York recently and returning he brought contracts for seven wooden vessels with him. Five are for M. T. Snyder of New Orleans, two to be similar to the motorship June and three considerably larger. Two wooden ore carriers for service between Philadelphia and the West Coast of South America are also to be built. They are to be 236 feet over all, 38 feet beam and 24.6 feet depth of hold. They are to be powered with two 320 horsepower semi-Diesel motors.

The Scandinavian-American Shipbuilding Co. has been incorporated here by Dr. Elof T. Hedlund, Claude McCulloch, L. R. Bailey and John F. Rose. They have secured a site and plan on building several wooden motorships. They will probably be building two or more hulls on their own account after the war demand drops off.

TACOMA

The Seaborn Shipyards Company launched the hull of the auxiliary schooner "Seaborn" on December 12. The molded dimensions of the vessel are 240 by 43 by 21 feet, lumber capacity 1,500,000 feet.

Vessels started to use the new 1000-foot wharf and warehouse of the Milwaukee Railroad during December. It is understood that the second unit of the big terminal plant will be started soon.

Work on the 100-acre tract on the Hylebos Waterway, the site of the new Todd Shipbuilding and Drydock Company, has sarted, and dredgers have been at work here for several weeks past.

SAN FRANCISCO

The Western Fish Company is having a 60-foot trawler built by William Cryer in East Oakland. A three-cylinder, 80 h. p. Standard engine will be installed in this craft.

With the departure of the steamer "Despatch" from Portland for San Francisco, the Border Line Transportation Company has opened a new freight service. The "Despatch" left Portland on December 22nd.

European Marine Notes

Exclusive Correspondence of "Pacific Marine Review"

THE official announcement of the purchase of the Wilson Line of steamers by Sir John Ellerman, Chaiman of the Ellerman Lines (Limited), Liverpool, came as a great surprise, not only in Hull, but British shipping circles generally. The negotiations had been carried out with the utmost secrecy. The result, however, possesses features which go some way to offset the regret at the disappearance of the Wilson firm from the shipping trade of the port of Hull. Wilson and Hull have been so long and closely associated as to become almost synonymous terms, and there can be no question that the great development of the third port of Great Britain has been due in a considerable measure to the energies and far-sightedness of the firm founded by Thomas Wilson, father of Charles Wilson, first Baron Nunburnholme, who represented West Hull for a quarter of a century, and Arthur Wilson of Tranby Croft, both of whom are deceased, and have been succeeded in turn by their sons in the direction of the immense undertaking.

The chief reason underlying the transfer of the whole of the shares of T. Wilson, Sons, and Co. to Sir John Ellerman is the desire to conserve and to utilize to the fullest capacity the shipping of the United Kingdom. The object will be secured by the absorption of the Wilson Line into the larger concern of the Ellerman Lines, thus eliminating the possibility of wasteful overlapping in the numerous trade routes from Hull and the Humber (Yorkshire, England) to all parts of the world. In an authorized announcement of the change it is stated that "for some time now it has been evident to those concerned in the management that definite steps must be taken to provide for the development of this large shipping business, so important to this port of Hull. Many ships have been lost, and it is more than ever essential that the very important lines served by the Wilson Company should be efficently served and extended on the conclusion of peace." It is also pointed out that "neutral shipowners have throughout the war been making much larger profits than British shipowners, and have not been subjected to the heavy taxation which the Government has had to impose on British shipowners in common with other traders. It is recognized that neutral shipowners will thus be in a position to utilize their profits to enter into severe competition. Accordingly, in view of the heavy cost and the difficulty of replacing lost vessels, it has been decided to enter into these amalgamation arrangements which, it is believed, will be for the benefit of British trade as a whole."

Neutral Competition

It may be added that the Humber ports, which deal with such a large proportion of the trade with Scandanavia and the Low Countries, would probably be the first to feel the pressure of this neutral competition, not only in the "trades" in Northern Europe, but in the Mediterranean and elsewhere. At the beginning of the year the Wilson steamers afloat including those jointly owned with the North-Eastern Railway Company, and covered by the arrangement, numbered 77, having a gross tonnage of 190,795. Since then several have been lost or captured. One new steamer for the New York trade has been added, and two other large ones are building. The aggregate of tonnage, however, is fully 20 per cent below pre-war standard, and would be insuffiicent to carry on the usual trades from Hull in time of peace. The Ellerman lines had commenced running out of Hull to India and the Far East before hostilities began, and with the large amount of tonnage at their disposal will be well fitted to supplement the Wilson fleet with the vessels which the shipping of Hull requires.

It is generally agreed in Hull commercial quarters that the amalgamation will be all to the good, and will enable Hull to retain its old position in trades which the port has so well maintained. It is, moreover, gratifying to have it on the authority of Oswald Sanderson, who will continue to be managing director, that the business will be conducted as it has always been, that there will be no change of policy, and that as before the utmost will be done to extend the trade of the port. The name of the Wilson Line will be retained. A further interesting and reassuring fact is that Sir John Ellerman has strong personal ties with Hull, at which city he was born in 1862. His father was Johann Herman Ellerman, Hanoverian Consul at Hull in the "sixties," who married a daughter of Timothy Reeves. Sir John married an East Riding (Yorkshire) lady, and for some time lived at Brough, near Hull. His commercial career has, however, been spent away from Hull, in whose shipping affairs he has had no part until now. Thirteen years ago, when the Bailey and Leetham firm was absorbed by the Wilson Line, the capital of Thomas Wilson, Sons, and Co., was $10,000,000 fully paid up capital and $2,500,000 debentures, the shares being held solely by the Wilson family.

A Huge Transaction

The terms of the present deal have not transpired, but, on the basis of the present value of shipping, it is currently estimated that the transaction represents anything from $25,000,000 to $35,000,000. The Wilson Line was founded upwards of seventy-five years ago, by Thomas Wilson in conjunction with Mr. Beckington and Mr. Hudson, under the style of Wilson, Beckington and Co., and owed its rise in its early days to the adoption of steam—first paddle steamers, and then screw steamers—and the possibilites it opened out of extending trading connections with the Baltic, and later to the Mediterranean, India, and New York, all of which have through the Wilson Line had regular shipping facilities from Hull over a great number of years. The present chairman is Edward Wilson, who has occupied that position since the death of Arthur Wilson, in October, 1909.

Simplifying Shipping Problems

A movement is on foot, I am told, for convening a meeting of representatives of all the leading British shipowning interests to consider certain proposals designed materially to lessen the difficulties of seaborne traffic arising from the reduction of available tonnage. The idea appears to be viewed with approval by the authorities here, the President of the Board of Trade, it is said, having considered it very carefully in all its bearings; and with this point in mind the amalgamation of the Wilson shipowning interests with those of the Ellerman group may be regarded as a step in the direction indicated, not only so far as the period of war is concerned, but after peace has been established.

Neutral Tonnage and Prohibitive Prices

While a certain amount of British tonnage is always changing ownership, there is now very little British buying of neutral vessels. Neutrals buy from other neutrals and also from Japan, but British owners do not see their way to compete with them in prices under existing conditions. Neutral vessels, being under no such restrictions as British ships, can usually rely on earning higher freights, as, for instance, in the case of the shipment of the Australian wheat, to which President of the Board of Trade Runciman referred on November 15. He pointed out that "gigantic" freights have now to be paid for the neutral vessels chartered, while British ships are requisitioned for the trade at the comparatively low Blue-book rates. It is true that British owners are now assured that any vessels they may buy from foreign countries will not be requistioned by the British Government, except in the event of urgent need, but the enormous difference between the war taxations here and in neutral countries is itself sufficient to enable neutrals always to outbid British owners both for new and second-hand tonnage. There is a large number of vessels in the United States and Japan which will be ready for delivery within the next six months, and the question is now being raised whether some special inducement could be given to British owners to purchase them. One suggestion is that British owners should be allowed to write off the amounts they expended on foreign tonnage over and above "reasonable prices"before becoming liable to excess profit taxation.

Improved British Shipbuilding Returns

The returns of Lloyd's Register of British merchant shipping under construction as at September 30 last show a certain improvement. There were on that date 469 vessels of 1,789,054 tons under construction, being about 249,000 tons more than the amount building at the end of the previous quarter and about 253,000 tons more than that building 12 months ago. These figures show a very substantial increase, but it is necessary to remember that returns of tonnage under construction are by themselves no complete guide to the state of shipbuilding, since ships may lie for months, and have done so during the war, uncompleted and untouched, because of the diversion of labor or because owners and builders could not come to terms on the difficult question of increased costs. These figures, therefore, are only of value when considered in relation to the numbers of vessels commenced and launched during the same period.

The Lloyd's figures show that in the past quarter work was started on 96 vessels of 320,120 tons, an increase of 15 vessels and 126,864 tons, as compared with the previous quarter. This comparison indicates plainly enough that a few more yards have been available during the past quarter for merchant ships, and to that extent is quite satisfactory. But the best index of all to the state of shipbuilding lies in the number of vessels launched. These during the past quarter numbered 86, or, oddly enough, the same number launched in the previous quarter, while the tonnage at 192,267 shows an increase of 35,738 tons. The figures for the June quarter had shown a substantial increase of 19 vessels and 76,368 tons over the previous quarter's figures, and it is satisfactory that the amount of tonnage launched during the past quarter has been more than maintained, while the other figure—those for tonnage under construction and tonnage started—have been so much increased.

Dominions Shipping Schemes

In British overseas dominions the tendency in favor of State shipowning is, I hear, steadily growing. Already a Commonwealth fleet is partly in operation, and Canada has almost decided to establish a North Atlantic line, chiefly for cargo carrying, the Dominion's great expense in connection with the war being, it is understood, the only obstacle to the immediate realization of the scheme. South Africa, likewise, has ambitions in the same direction. One proposal much favored there, I understand, is that the Union Government should borrow from the Imperial authorities the money to construct six fast steamers of about 15,000 tons each, and that, as the vessels could be taken over by the Admiralty as auxiliary cruisers in time of war, South Africa would save not only its annual contribution towards the upkeep of the navy, but the money it pays every year for the carriage of the mails. A few weeks ago the New Zealand Prime Minister foreshadowed in the House of Representatives the creation of a State line of 20,000-ton steamers running at 20-knot speed between the Dominion and this country. On his present visit to London, on, as he puts it, business of great importance, he is accompanied by Sir Joseph Ward, the New Zealand Minister for Finance, who was responsible at the last Imperial Conference for the resolution affirming the desirablity of giving effect to the "all-red route" project. The visit is being much discussed in shipping circles here, as it is known that proposals to improve and develop communication between the different parts of the Empire after the war have been under consideration for some time.

Japaneses Ships For Sale

Quite a number of fine new Japanese cargo steamers are being offered in the London market. Some are ready for sea, others can be delivered within the next few months. But at the prices now being asked British owners, badly as they need to replace their lost vessels, show no inclination to consider them. For splendidly-built cargo steamers of 10,000 tons dead weight, about $200 a ton, amounting to $2,000,000, is now being asked. Before the war, ships capable of performing precisely the same service could have been very comfortably built for $40 a ton, or $400,000. The present prices are, therefore, just five times the pre-war prices. A steamer flying the British flag could rely, if not requisitioned by the Admiralty, on earning $7.50 a ton dead weight for 12 months. That is, the steamer of 10,000 tons would earn $75,000 a month. Putting expenses at $20,000 a month (they might well be more), the monthly profit would be $55,000, or, say, $650,000 for the year.

On the $2,000,000 new capital the owners would be allowed to earn 6 per cent, or $120,000, before becoming liable to excess profit taxation. That deducted from the total profit of $650,000 leaves $530,000. Of this the Government would take 60 per cent, or $318,000, in excess profit taxation, leaving $212,000. On this sum income tax at $1.25 (super-tax is not reckoned in the calculation) would amount to $53,000, leaving $159,000. If the owner applied the whole of this sum to depreciation and could rely on earning the present abnormal freights for about 10 years, and was content with 6 per cent profit, it would only be, on the basis of the figures quoted above, at the end of that period that he would be able to write down the value of the ship in his books to the pre-war cost of a similar and competing ship. Owners are, however, bound to take into account the possibility of the war ending within a year or two. If it ended a year hence, they would have a vessel still representing a value of $1,840,000, and having to compete with ships originally costing only $400,000, and written down to a figure far below that sum.

Salvage vs. General Average

FROM a recent issue of "Fairplay" it is learned that an interesting case touching the apportionment of salvage charges may be presented to the courts for settlement.

A steamer under charter for homeward cargo was outward bound in ballast, got into trouble, and salvage charges were incurred for services rendered. It is contended that the chartered freight should contribute its share of the salvage expenses.

Under English law chartered freight must contribute toward general average expenses and sacrifices whether the cargo is on board or not, and the question in this case is as to whether or not salvage expenses are of a nature so akin to general average expenses as to entitle them to contribution by the chartered freight. The law is clear so far as general average expenses and sacrifices are concerned, but there seems to be no decision with regard to salvage charges, and the difficulty seems to be in drawing the line between the two.

General average expenses and sacrifices are incurred by the will of the master for the benefit of all concerned, and there is a mutual bond between all concerned for the proper settlement of the losses. If the sacrifices incurred are of the ship, then the shipowner has a lien on the cargo for its proportion of them; if the sacrifices are of the cargo, then the cargo has a lien against the ship for its proportion, the community of interest making each party to the venture liable to every other party for the proper liquidation of obligations that have been incurred for the benefit of all.

Salvage expenses, however, are of a somewhat different nature. It is true the exepnses are incurred, and the services performed usually with the consent of the master, but neither he nor the shipowner has any right to bind the cargo to pay salvage, nor has the shipowner a lien on the cargo for such expenses. The lien for the services rests with the salvor, and his lien is against the ship and each lot of cargo separately. The master may make a contract with a salvor to extricate his ship and the cargo from a perilous position, but that contract is not binding on the cargo, and the cargo owner may repudiate or the entire contract may be repuidated by the shipowner. In that event the salvor may dicker with the ship and cargo owners separately, or he may file a libel against all interests separately. He cannot recover from any one part of the venture the entire amount of the salvage against all interests, and if he loses his lien on any one part the loss is his alone.

On first consideration it would seem as if, so far as the liability of chartered freight to contribute is concerned, there would be little, if any, difference. In both cases the result as to the venture is the same. The general average expenses incurred, toward which the chartered freight must contribute, and the salvage services as to the liability for contribution by the chartered freight, there appears to be some doubt, have resulted in the ultimate saving of that freight, and it would seem that the same liability to contribution exists. But in the case of salvage services rendered the salvor has a lien against the property saved, and the question arises is the chartered freight not on board a tangible thing upon which a lien may be filed.

By the laws of the United States chartered freight not on board does not contribute to general average expenses or sacrifices, and this question would have but little interest here but for the fact that many of the insurance policies now issued provide that liability for and settlement of all claims shall be based on English law and practice and an underwriter on chartered freight not on board might find himself liable for heavy salvage expenses.

The Chester Shipbuilding Company, Chester, Pa., launched the oil tanker "Golaa," a sister ship to the "Malmanger,"on November 25th. The vessel is an 8800-ton d. w. carrier, driven by Westinghouse geared turbines. She is being built to the order of Fritj Siegworth of Bergen, Norway.

The new concern which will operate the plant of the New York Shipbuilding Company, and which is known as the New York Shipbuilding Corporation, is organized with $25,000,000 capital, and has the following Board of Directors: George J. Baldwin, president of the Pacific Mail Steamship Co.; P. A. S. Franklin, president of the International Mercantile Marine Co.; Joseph P. Grace and L. H. Shearman of W. R. Grace & Co.; Robert F. Herrick, vice-president of the American International Corporation; S. M. Knox, president of the New York Shipbuilding Co.; Ambrose Monell, president of the International Nickel Co.; Charles A. Stone, president of the American International Corporation; W. S. Kies, vice-president of the American International; William Finlay Morgan, E. P. Swenson, of S. M. Swenson & Co.; and Henry H. Wehrhane, of Hallgarten & Co.

It is understood that the United States Shipbuilding Company has purchased land on the Thames River, near New London, for the purpose of increasing the output now possible from their Noank yard.

The new Pennsylvania Shipbuilding Company at Gloucester, New Jersey, is about to start actual building by laying the keel of a 7000-ton tanker. It is understood that this concern has six of these tankers and four 12,500-ton freighters on order.

The Coastwise Shipbuilding Company of Baltimore, Md., has five steel, sea-going barges for the Philadelphia and Reading Railway well under way. This shipbuilding plant was started in June, 1916.

The Alabama-New Orleans Transportation Company, with a shipyard near New Orleans, is building four small 16,000 barrel tankers for the Mexican Petroleum Company of New York. The boats will be used in the Tampico-New Orleans trade, and are the first steel tankers to be built on the East Coast south of Newport News.

CATALOGS AND FIRM PUBLICATIONS

The George A. Boyden Pump Company of Baltimore have issued a handsome phamplet descriptive of their latest design, a pump in which the stuffing box is eliminated. This is accomplished by constructing both cylinders in a single chamber, with a piston rod dividing same, and being enclosed with the piston heads without any contact with the atmosphere. The piston rod carries its packing back and forth with its reciprocating movement, and does not require any "stuffing boxes" whatever.

THE COEN FURNACE FRONT.

In the construction of many steamers it is now required that the boiler furnaces be so arranged that either coal or oil fuel can be burned and that a minimum amount of time and labor be expended in altering the furnaces when changing from one fuel to the other.

In installing marine fuel oil burning systems in steamships with Scotch boilers it has usually been the custom to build up a brick arch baffle ring in the mouth of the furnaces for the purpose of directing the incoming combustion air into the atomized oil spray, thus assuring an early combustion of the fuel. In the case of a steamer where it is desirable to use coal fuel one part of the time and oil another, the brick baffle ring is impracticable, as it would be necessary to tear them out in order to prepare the furnaces for coal firing, and when changing back to oil these rings would have to be built in again. This would necessitate carrying a supply of fire brick at all times and also expense on account of materials, labor and delay.

Mr. Garnet W. Coen, of San Francisco, has devoted a great deal of time and study to evolving a metal ring that would have the advantages of the brick ring and none of its serious drawbacks. The object which he held in view was to secure a ring that could be quickly installed, that was self-supporting when assembled in the furnace and which could be spread or expanded to fit different sizes of furnaces.

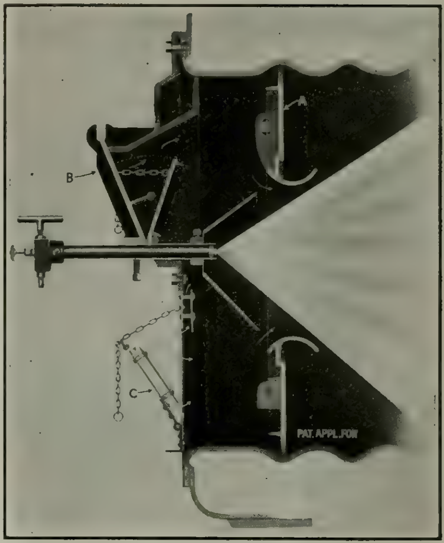
The accompanying illustration gives an excellent idea of the way in which this invention of Mr. Coen's has met the difficult requirements presented by the necessity of having to change over furnaces from coal to oil firing whenever the prices of the different fuels or the lack of oiling facilities cause a change to be required.

The lower half of the furnace plate is hinged to the upper half to permit to serve as an ash door when the boiler is burning coal, while the upper half is bolted to the front of the boiler. The lower half of the furnace plate is provided with a separately hinged door which may be opened to any desired position and secured by a chain, this being for the purpose of admitting air when oil is being burned.

An oil burner extends through and is secured in a door which is pivotally mounted on lugs on the upper half of the furnace front, and this door carries a second door, also pivotally mounted. This door may open inwardly to permit the admission of air to the upper half of the furnace box and is secured in any desired position by a chain.

The baffle plates are so arranged as to be readily adjustable so as to allow the outer periphery of the segmental plates to fit the interior of the furnace box.

In actual practice it will be seen that the combustion baffle plate divided the fire-box into a forward air chamber and a combustion chamber. The space between the furnace front proper and the plate depends entirely upon local conditions and may be increased or decreased at will. The central opening permits the atomized oil from the burner to freely discharge into the combustion chamber in the direction indicated, and, as air is admitted through both the lower and the upper doors, an ideal distribution of incoming air and the atomized oil is obtainable.



The Coen Combustion Baffle Plate.

The inwardly extending cooling ribs, being exposed to the comparatively cool incoming air, prevent the plate from overheating and burning.

Another important advantage obtained with a combustion baffle plate such as is here shown, is that it permits the air to be directed and brought in contact with the incoming atomized oil practically at the tip of the burner, in this manner permitting the fire to burn from one end of the furnace to the other.

In case of a steamship where it is desired to use oil fuel part of the time and coal fuel at other times, a combustion baffle plate of the type here shown is of great importance as it can be quickly removed or replaced whenever desired without necessitating a complete cooling down of the boiler. It also eliminates the tearing down or rebuilding of brick rings, and, as the plate is at all times kept comparatively cool by the incoming air, the life of the plate is practically unlimited.

With the front as shown, the insertion of grate bars when coal is employed can readily be accomplished, as the whole lower section of the furnace front is hinged. This also exposes the whole ash pit when cleaning fires.

Peninsula Shipbuilding Company

BUILDERS OF SHIPS

General Office and Yards
FOOT OF McKENNA AVENUE
Portland, Oregon

We welcome the opportunity of submitting competitive bids on the plans of any ship which can be built of wood.

Ships under construction for our own account on ways and for sale.

We use Douglas Fir for ship construction. It has Buoyance and Strength.

MOLD LOFT FLOORS

The problem of securing the most efficient flooring material for a mold loft is one that every shipbuilder is naturally much interested in. It is necessary to secure flooring that will not check, warp or crack, and which is durable enough to maintain a good surface without too frequent resource to dressing down. Shipbuilders are finding the white Port Orford cedar a splendid wood for mold loft flooring and quite a demand for this material has been created. The loft at the Alameda plant of the Union Iron Works Company has just been laid with Port Orford cedar furnished through the Van Arsdale-Harris Lumber Company of San Francisco. This floor is 100 by 400 feet in size and is laid with 63,000 board feet of 1½ inch by 3 inch t. and g. Port Orford white cedar, and the scrive board is 100 by 100 feet and is laid with 36,000 board feet of 3 inch by 3 inch Port Orford cedar. Other shipbuilding concerns that have recognized the superior qualities of this western wood are the Fore River Shipbuilding Corporation, the Pennsylvania Shipbuilding Company, Pusey and Jones and Samuel L. Morse at Elizabethport, New Jersey. Besides its durability and freedom from checking and warping, the Port Orford white cedar has a clear, uniform color, a feature which is of considerable importance in a mold loft floor.

OPENS BROKER'S OFFICES

Mr. A. M. Gillespie, one of the best known shipping men in the Northwest, has opened offices in the Arctic Building, Seattle, as a shipbroker, for the sale and charter of vessels. Mr. Gillespie came to Seattle ten years ago to look after the Pacific Coast interests of Andrew Weir and Company, which concern was then operating the Bank Line. Mr. Gillespie had been with the Weir people for twenty-five years, holding important positions in their Glasgow and London offices. Shortly after arriving at Seattle, he became vice-president of Frank Waterhouse and Company, and it is from this position that he resigned to take up the chartering business for himself.

Mr. Gillespie starts in business with the following important commissions on his hands: Puget Sound representative of A. O. Andersen and Company of Christiania and Copenhagen; Puget Sound representative of B. Stolt-Nielsen of Norway, for whom the Skinner and Eddy Corporation is building a fleet of freighters; Pacific Coast Chartering Broker for Frederick Tillet and Company of London, a very important British chartering firm, and Pacific Coast representative of the Yamashita Kisen Kaisha of Kobe, Japan.

Cummings Engine Log

Tells You Instantly and Accurately Just how Far your Ship has Travelled

Not many years ago the only method of ascertaining a ship's speed, was to cast out the log and calculate from the length of the line played out—a very crude method indeed. Today how different.

No guess work—no head work—everything figured to an exactness unattainable otherwise except by hours of most accurate calculation.

CUMMINGS SHIP INSTRUMENT WORKS
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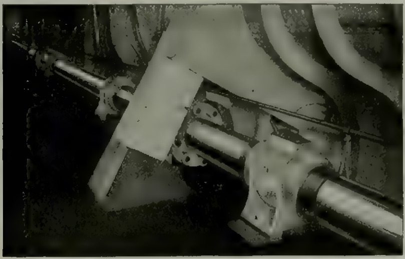
HALLORAN & GOLCHER, - Sharon Bldg., San Francisco
W. S. DePIERRIS CO. - 103 Grand Trunk Dock, Seattle

A TRIP THROUGH AN OCEAN STEAMER

A visit to the engine room and hold of the steamship "Bermudian" plying between New York and Bermuda in the service of the Quebec Steamship Company, gives one an insight into the efficient and economical lubrication of large marine bearings.



One of the Main Shafts S. S. Bermudian.

What strikes one as something of more than passing interest is the method used in lubricating the tunnel bearings. For the information of land lubbers, tunnel bearings are those that support the main shaft in the hold of the ship between the engine and propeller.

The "Bermudian" has two shafts, 15 inches in diameter. Including the two thrust bearings there are altogether 9 bearings to a shaft, each shaft carrying 3500 h. p., operating at about 86 revolutions per minute.

A Bearing Cap Main Shaft S. S. Bermudian.

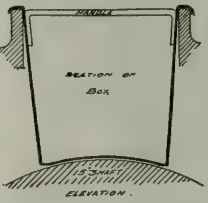
The Chief Engineer, Mr. E. D. Edwards, lubricates the tunnel bearings in a rather novel way. The bearing caps are constructed with a large opening at the top about 8 x 5 inches and about 7 inches deep to the shaft. In this opening there is inserted a grease box made of brass or galvanized iron formed to fit the opening, with a lip at the top which supports the box in position and permits the bottom of the box, which is formed to the curvature of the shaft, to rest within 1-16 inch of the shaft.

The bottom of the grease boxes are perforated with a number of holes about 1-8 inch in diameter. Albany Grease No. XXX is taken from barrels and cut up into chunks, then placed in the bearing boxes. As the temperature of the shaft, when in motion, rises above the normal, it is immediately impressed upon the Albany Grease in the bearing boxes, which causes it to soften and work through the perforations to the shaft, lubricating the bearing and reducing the temperature of the shaft to normal. Albany Grease will not soften and flow again until the bearing temperature rises. This is practical, automatic lubrication.

Albany Grease Box, Main Shaft S. S. Bermudian.

To make certain that a constant supply of Albany Grease is always on the bottom of the grease boxes, a wooden rod is kept in each box to work the Albany Grease down, by the oilers on their regular rounds.

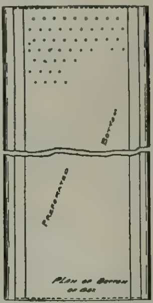
Each bearing box holds about 2 lbs. of Albany Grease. There is about 40 lbs. of Albany Grease consumed in these tunnel bearings per trip, which takes about 40 to 45 hours, according to weather conditions. Although the temperature at times is quite high in the engine room and hold, the tunnel bearings give absolutely no trouble whatever in so far as heating is concerned. They secure all the lubrication they need at the lowest possible cost.



The condition of the bearings during, and after a trip is perfect in every detail.

Running alongside each shaft there is a water service. Each bearing is provided with a water spout which was used in the old days to keep the bearings cool when the lubricant used did not give the requisite amount of lubrication. This water service has been entirely abandoned as there is absolutely no need of it since Albany Grease has been used.

The method outlined above has been used by Chief Edwards for the past nine years on the "Bermudian" and on other boats for an additional six years, making fifteen years that this idea has been in service under Chief Engineer Edwards. In the engine room proper on the "Bermudian," Albany Grease is used in large marine cups on the eccentrics and is giving perfect service.



Something must be mentioned about the spic and span conditions of the tunnel bearings on the "Bermudian." The mussy dirty conditions generally found where oil is used on the tunnel bearings are not to be found on the "Bermudian." The bearing caps of the tunnel bearings on the "Bermudian" are painted white and remain this color. If there were a continuous waste of Albany Grease as there is with oil, these bearings

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INSURANCE BROKERS AND AVERAGE ADJUSTERS

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SHIP-BUILDER
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Wooden Commercial Vessels
of all Descriptions
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Kennedy & Boehmer Streets
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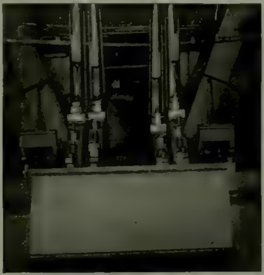
would require painting every hour. "By using Albany Grease," says Chief Edwards, "we get the best of lubrication service, with the minimum amount of attention and at lowest possible cost."



Eccentrics, Main Engine S. S. Bermudian.

EASTERN NOTES

A most important court decision relating to wireless was rendered a few days ago by Judge Neterer, in the Federal Court of Western Washington, Judge Neterer holding that the wireless apparatus of the Kilbourne & Clark Manufacturing Company does not infringe the patents held by the Marconi interests.

This places the Kilbourne & Clark Company of Seattle, in a particularly strong position, for this concern has already equipped more than 125 ships on the Pacific, Atlantic and Great Lakes, and has contracts, just recently signed, for almost 200 more vessels.

Also the Kilbourne & Clark people have made notable advances in the installation of land stations, for there are many such stations along the Pacific Coast, and especially in Alaska.

Fore River Shipbuilding Corporation increased their employees' wages ten per cent on December 4th.

William C. Williamson, one of the original firm of Williamson Brothers, which was afterwards Williamson Brothers Company and which is now the American Engineering Company, was buried on December 13th from his son-in-law's (H. W. Hand) residence in Oak Lane, Philadelphia. A great many marine men and officials of the shipyards east attended the funeral.

Harry Anderson, manager of the Bethlehem Steel Company's Sparrow Point Shipyard is now in Sweden visiting his mother. He is expected to return to America in January.

A. J. Taphouse, who represented the Anglo-Saxon Oil Company and Shell Company while Harlan & Hollingsworth Corporation were building the steamers "Pearl Shell," "Gold Shell" and "Silver Shell," went back to England on December 9th in the steamer "St. Louis." Mr. Taphouse was a very efficient representative of the owners. These steamers were the first steamers built in the United States for British owners. Mr. Taphouse endeared himself to everyone in the United States not only to Harlan & Hollingsworth Corporation, but to various repair yards along the Atlantic Coast by his absolutely fair dealing. He showed himself to be a man of the highest integrity. All his American friends wish him a safe journey.

The steel manufacturers, on account of the difficulty in making marine steel to the U. S. Steamboat Inspection requirements are now asking 15 cents a pound at the mill for such grade of material. This is equal to $300.00 a ton. One year ago this material was selling for $40.00 a ton.

Among its recent sales, the Eckliff Automatic Boiler Circulator Co. reports the following: Seven sets of Eckliff Circulators to Quartermaster Corps, War Department, for vessels stationed in the Philippines; six sets for U. S. Navy Hospital Ship "Solace"; four sets for U. S. Army Transport "Kilpatrick," two sets for U. S. S. "Marinduque," Government of the Philippine Islands, War Department, Bureau of Insular Affairs; two sets for Standard Oil Co., (New Jersey); nine sets for Darrow-Mann Company, Boston; two sets for New England Coal & Coke Co., Boston.

WHITE BROTHERS

THE LARGEST STOCK OF HARDWOODS IN THE WEST

HARDWOOD
LUMBER
FLOORING
VENEERS
PANELS
ETC., ETC.

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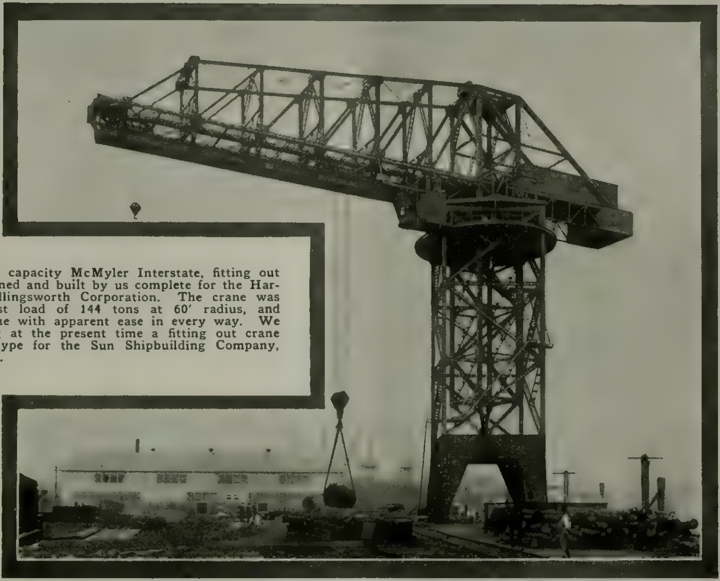
SAN FRANCISCO

INDIANA BENDING OAK · TEAK · ASH
WHITE CEDAR · IRON BARK · MAHOGANY
LONG OAK KEELS
EASTERN WHITE AND RED OAK, ETC.

WYBROLITE WATERPROOF VENEER PANELS

FITTING OUT CRANES FOR SHIP YARDS



A 120-ton capacity McMyler Interstate, fitting out crane, designed and built by us complete for the Harland & Hollingsworth Corporation. The crane was given a test load of 144 tons at 60′ radius, and handled same with apparent ease in every way. We are building at the present time a fitting out crane of similar type for the Sun Shipbuilding Company, Philadelphia.

Fitting out cranes from 5 to 20-tons capacity having available working radii of about 100′. The machine on the right is one of several built for Cramp & Sons of Philadelphia, and the machine on the left is one of several built for the U. S. Navy Yard at Boston, Mass.

We have completed several fitting out cranes for the U. S. Navy Yard at Norfolk, at Philadelphia, at Boston, and for several other private shipbuilding companies. At the present time we are building two fitting out cranes of the above type for the U. S. Government Navy Yard at Mare Island.

If you are interested in providing your shipyards with the very latest equipment handling machinery it will pay you to investigate this type of crane. Full information will be sent on request.

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Nearest You

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McMYLER
INTERSTATE
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Cleveland, Ohio

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NEW YORK
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A BUSY IRON WORKS

In 1916, the vessels for which the Main Street Iron Works completed the machinery or have underway, are as follows:

Steamer Port Angeles—Boilers, Babcock & Wilcox Water Tube; owners, Chas. Nelson Co., triple expansion marine engine size 15½-26-43x33; builder of hull, Kruse & Banks of North Bend.

Steamer Stanwood—Boilers, Babcock & Wilcox Water Tube; owners, Byxbee & Clark Company; triple expansion marine engine size 13½-23-40x30; builder of hull, Kruse & Banks of North Bend.

Steamer Phyllis—Boilers, Babcock & Wilcox Water Tube; owners, Chas. R. McCormick & Co.; triple expansion marine engine size 13½-23-40x30; builder of hull, Andrew Peterson of Aberdeen.

Steamer Wahkeenah—Boilers, Babcock & Wilcox Water Tube; owners, Chas. R. McCormick & Co.; triple expansion marine engine size 13½-23-40x30; builder of hull, Wilson Bros. of Astoria, Ore.

One steamer—Boilers, Babcock & Wilcox Water Tube; owners, Chas. R. McCormick & Co.; triple expansion marine engine size 13½-23-40x30; builder of hull, Wilson Bros. of Astoria, Ore.

Steamer Ryder Hanify—Boilers, Babcock & Wilcox Water Tube; owners, J. R. Hanify & Co.; triple expansion marine engine size 15½-26-43x33; builder of hull, W. F. Stone of Oakland.

Steamer Robt. C. Sudden—Boilers, Babcock & Wilcox Water Tube; owners, Sudden and Christenson; triple expansion marine engine size 15½-26-43x33; builder of hull, W. F. Stone of Oakland.

Steamer Horace X. Baxter—Boilers, Babcock & Wilcox Water Tube; owners, J. H. Baxter & Co.; triple expansion marine engine size 13½-23-40x30; builder of hull, Kruse & Banks of North Bend.

Steamer Edna Christenson — Boilers, Ward Water Tube; owners, Sudden and Christenson; triple expansion marine engine size 16-27-46x33; builder of hull, Chas. E. Fulton of San Pedro.

One steamer—Boilers, Ward Water Tube; owners, Sudden and Christenson; triple expansion marine engine size 16-27-46x33.

Steamer Lucinda Hanify—Boilers, Ward Water Tube; owners, J. R. Hanify & Co.; triple expansion marine engine size 16-27-46x33; builder of hull, Chas. E. Fulton of San Pedro.

One steamer—Boilers, Ward Water Tube; owners, J. R. Hanify & Co.; triple expansion marine engine size 16-27-46x33.

A NEW FLOORING MATERIAL

By L. H. Price

One of the problems of the shipbuilding industry in the past has been in the fact that there was no flooring material on the market which was completely satisfactory for galleys, mess rooms, and like places. The ordinary wooden flooring, which has been used almost exclusively in the past, has been used not because of its beauty or of its sanitary features, but because it was cheap and light, and seemed to have fewer objectionable features than any of the other types of flooring to be had. Linoleum is unsanitary, wears out, and rots away. Tile terrazzo and cement must be laid at least 2½ inches thick, and consequently are so heavy that they detract considerably from the capacity of the ship, and, in addition, the revibration and straining of the ship is bound to crack and break them up.

The writer wishes at this time to call the attention of readers of the Pacific Marine Review to a new type of flooring, which is now being placed on the market, and which bids fair to become very generally used as a flooring on ships, and which in a measure combines all the desirable qualities of an ideal flooring for marine use. This floor, called Hoffite Plastic Asbestos Flooring, is a combination of magnesite and asbestos, with other fillers, and is laid in plastic form over wooden or steel decking, usually from 1 to 1½ inches in thickness. At a thickness of one inch the material will weigh about 7 lbs. to the sq. ft. This material is fireproof, waterproof, elastic and resilient under foot, and can be laid in any color or combination of colors. This magnesite, or oxychloride cement as it is sometimes called, is inherently different from Portland cement, the setting agent, magnesium oxide, forming a product which, instead of being brittle, is very elastic. As a result of this fact flooring made from this cement will not crack, but will expand or contract with the material upon which it is laid.

Recent tests of this material made by Smith, Emery & Co., showed it to have an average tensile strength at 28 days of 1620 lbs. per sq. inch, and a compressive strength of 11,318 lbs. per sq. inch at the same age. This shows the material to be four or five times as strong as an ordinary 3 to 1 mix of sand and Portland Cement. The test further showed the material to be impervious to water under 65 lbs. pressure for 24 hours, and to stand a temperature of 2500 degrees for two hours without cracking or becoming distorted.

Magnesite, the base of this material, formerly came almost entirely from Austria-Hungary and Greece, but the present world conflict has cut off these sources of supply, and the material is now being mined and prepared by the John D. Hoff Asbestos Co. of San Francisco from crude ore obtained by them from their mines, located near Livermore and Portersville, California.

Galley floors have generally in the past been formed by brick imbedded in concrete, but this practice has led to serious complications, especially in steel ships, for both brick and concrete are very porus and rapidly absorb and hold moisture, with the result that the decking below will rot or rust out. Palpably, the replacing of this decking when necessary is a very expensive thing, and, in addition, at no time has the floor been what might be called sanitary. Hoffite does away with these objectionable features, as it is waterproof, and when once laid over a deck hermetically seals it and protects it, making it last as long as the ship. Although the surface of this material is very smooth and easily kept clean, still at the same time it has the peculiar property of not being slippery even when wet. In galleys and mess rooms Hoffite is usually laid with a six-inch coved base turnedup against the wall, thus doing away with any cracks and crevices which might collect dirt and filth. Because of the sanitary features of this material, the San Francisco Board of Health is requiring its use in all kitchens or places of a public character where foodstuffs are cooked or prepared. The touch of color which this product provides will in itself in many cases prove sufficient incentive to its use, as it will liven up an otherwise gloomy interior.

Van Arsdale-Harris Lumber Company
FIFTH AND BRANNAN STREETS SAN FRANCISCO, CALIFORNIA
White Cedar, Spruce or Sugar Pine Template Lumber
Worked to Any Thickness Desired
Redwood Pattern Stock
In All Grades and Thicknesses
White Cedar
For Mould Loft Flooring
Long Clear Fir Timbers • Vertical Grain Fir Decking
Sugar Pine • California White Pine

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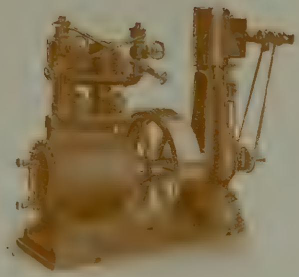
PACIFIC MARINE REVIEW

From an original pencil sketch by James Cornish, formerly Chief Surveyor to Lloyds, London

FEBRUARY 1917

Marine Refrigeration

COOL SHIP'S STORES MAKE ICE COOL WATER



BRUNSWICK

MARINE ICE MACHINES

MANUFACTURED BY

Brunswick Refrigerating Company

Main Office and Works - - - - - New Brunswick, New Jersey

Pacific Coast Branches in

Los Angeles *San Francisco* *Seattle*

PACIFIC MARINE REVIEW

The National Magazine of Shipping

VOL. XIV, No. 2 SAN FRANCISCO FEBRUARY, 1917

Canal Terminal Works

THE Panama Canal in operation is no less interesting than was the Panama Canal under construction. The Government is transforming the canal zone into a region where a ship can receive practically anything from supplies to repairs.

Naturally dry dock facilities and coaling plants have taken precedence over other matters, and today the Isthmus boasts of a fine dry dock, the first of a pair contemplated, two fine coaling plants, and oil storage stations.

The new graving dock at Balboa has an entrance 110 feet wide, and a width at top of coping of 143 feet. The length on center line from point of miter sill to head is 1,044 feet, and the length from outside of masonry at entrance to inside of head is 1,110 feet. There is 36 feet of water over 4 feet 6 inches blocking and 39 feet 6 inches over sills at mean water level. The volume of water contained in the dock at mean sea level is 5,265,000 cubic feet.

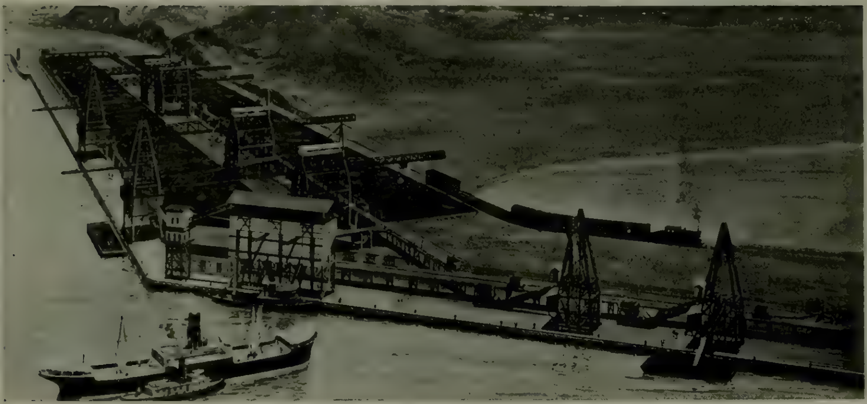
The dock excavation is in rock, which for the most part was hard. The floor is merely the excavation surface smoothed over, the surfacing varying from one to five feet in thickness. The floor is level longitudinally and also transversely for 66 feet in width, from whence it falls 6 inches to the gutter along each side. The side walls average 29 feet 6 inches in width, and are 12 feet thick for the upper 20 feet. The working faces are formed into four altars each 3 feet wide. To prevent hydrostatic pressure behind the walls, a drain is formed at elevation —27.5 feet, with communication with the dock body. Extending completely around the dock and connecting with tracks on the entrance pier is a 22-foot gauge track with a 50-ton at 87-foot reach traveling crane. The entrance is closed by a pair of steel mitering gate leaves, which are identical with the lock gates, with the exception that the bearing surface is fitted with Demerara Greenhart instead of nickel steel. Outside of the miter gates is a granite seat for the lock entrance caisson, which is used as a temporary gate when the miter gates require cleaning or repairing.

The dock is flooded through culverts in the base of each side wall. Each of these two culverts has twin openings to the sea 8 by 12 feet in size. The suction chamber is 22 feet in width by 12 high by 80 feet long. At mean high water, the dock can be flooded in 30 minutes. The flooding intakes are closed by valves operated by water at 300 pounds pressure, which is furnished by accumulators in the pump room.

The pumping plant is for the accommodation of a second dock, as well as for the one now finished, and consists of four main pumps, two drainage pumps and one bilge pump, all located in a rectangular pump pit about 100 by 35 feet in size. In the pump house there is also a permanent compressor plant, consisting of one 2,250 and one 5,500 cubic feet motor-driven compressors. These machines supply compressed air for the shops as well as for use around the docks.

Fully as interesting as the shops and dry docks at the canal are the two great coaling stations at Cristobal and Balboa, the Atlantic and Pacific terminals of the canal.

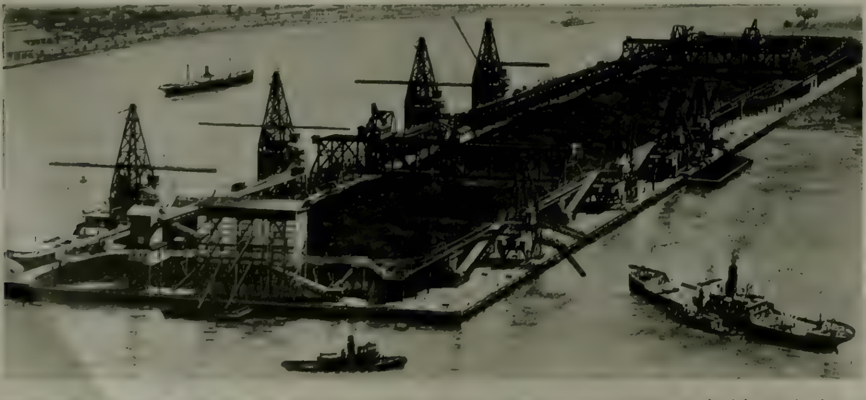
The Cristobal station is said to be the largest single coal receiving and distributing plant in the world. It covers about 20 acres, being 1800 feet long by 460 feet wide, the "coal pile" space being



Contractor's drawing of the 200,000 ton coaling plant at Balboa. The two unloaders are at the left, wharf bunker in center, two reloaders on right. Distribution is effected by the four movable cantilever cranes in the rear and by means of the viaduct as shown.

1,700 by 307 feet. At the offshore end, this coal space is excavated to a depth of 27 feet below mean water level for a distance of 500 feet, providing wet storage for 100,000 tons of coal. Over the wet storage space, coal will be piled to depth of 35 feet, and over the dry storage to a depth of 33 feet, giving a total storage of 485,000 tons. For conveying the coal, a steel viaduct 29 feet high is built all around the storage space, carrying two loops of 3-foot gauge electric railway. The full capacity is 2,000 tons per hour, and this requires the use of 88 steel conveyor cars on the viaduct. For unloading coal there are four steel towers of the skeleton steeple type, each having a 2½ ton grab bucket, operated by a hoisting and trolley engine, supported on sixteen wheels running on two 3-foot gauge tracks 34 feet 6 inches from center to center. These four unloaders dig coal from colliers at a combined rate of 1000 tons per hour, and discharge it into the conveyor cars. The coal pile is spanned by two steel duplex stocking and reclaiming bridges, having a stocking capacity of 1,000 tons per hour, and the same reclaiming capacity. These bridges are 315 feet long and weigh with their equipment 1,400 tons each. These bridges are supported at each end by 32 33-inch steel car wheels, on which they traverse the entire length of the storage space. The coal is reclaimed from storage by means of four bridge diggers, two on each bridge, which traverse on the upper chord of the bridges and reclaim coal by means of 5-ton grab buckets, which discharge the coal into the conveyor cars. The normal capacity of each digger is 500 tons per hour.

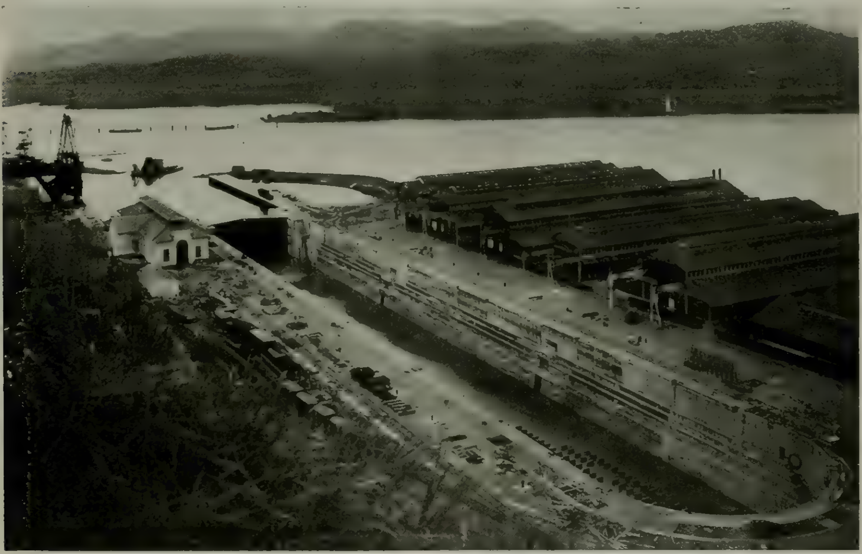
The four reloaders or delivery machines are steel towers supported on 16 wheels running on two 3-foot gauge tracks on 26-foot centers. Each delivery machine has an inclined belt conveyor parallel to the quay wall and leading up from a trailing hopper truck which receives coal from the cars dumping through the viaduct. This inclined belt feeds another belt conveyor carried in a hinged boom, which extends out at right angles to the wharf about 30 feet and discharges into a vessel's



Contractor's drawing of the new 485,000 ton coaling plant recently opened at Cristobal. The structures on the left are the four unloader towers. In the foreground is the wharf bunker. The towers in right foreground are reloaders. The two structures spanning the coal piles are the stocking and reclaiming bridges. Distribution is effected by the overhead viaduct running round the outside.

hold through a telescopic chute. The feeder can be regulated to operate at six different speeds, giving a capacity of from 50 to 600 tons per hour for each reloader. With the exception of the steam unloading towers, the station uses electric power. The transformer station receives current at 2,300 volts, 3-phase, 25 cycles from the Gatun Sipllway hydro-electric station and transforms it to 440 volts for power and 110 volts for lighting.

The topography shown in the accompanying cut is slightly out of drawing, but gives a better idea of the plant than any pictures so far secured. This plant recently delivered 50 tons of coal to a ship in three minutes, and 400 tons to another ship in 38 minutes. In ordinary practice its capacity to deliver is only limited by the ship's ability to receive. The structures on the left are the four unloader towers, in the foreground is the wharf bunker, the towers in the right foreground being the reloaders. The two structures spanning the coal piles are the stocking and reclaiming bridges, while distribution from point to point is made by these and the viaduct shown running around the outside.


General view of new 1,000 foot dry dock at Balboa, with coaling plant on the left and shops on the right. A dredge is shown cutting a channel through the earth cofferdam which protected the dry dock entrance during construction. The canal channel lies between the shops and the light tower shown on the opposite bank. Ships coming from the Pacific move across the picture to the right. At the right of the shops as shown is a new group of piers.

At Balboa, the Pacific terminal of the canal, a similar but smaller coaling station has been established. In the contractor's drawing of this plant, shown herewith, two unloaders are shown at the left, the wharf bunker in the center and the two reloaders at the right. Distribution is effected by the four movable cantilever cranes in the rear and by means of the viaduct as shown. Here, as at Cristobal, both wet and dry storage are used. The cantilever cranes in use at this plant are the old Pacific Locks' concrete handling cranes, which were rebuilt for this purpose.

These great plants and dry docks taken in conjunction with the extensive shops, wharves and quays, form a homogeneous system of works calculated to take care of any emergency that may arise in the operation of ships through the Canal.

The annual report of the U. S. Coast and Geodetic Survey is a highly interesting volume, containing much pertinent information especially relative to the conditions of water surveys along the Pacific Coast. The condition of water surveys on the Pacific Coast is quite startling when compared with the same conditions in the Philippine Islands. In Alaska 9 per cent of the water area that should be surveyed has been gone over in the last thirty years, which means, at the present rate of progress, 333 years to finish the job. On the California Coast 27 per cent, on the Oregon coast 14 per cent, and on the Washington coast 44 per cent of the first navigable water survey has been completed by work covering a period of 66 years, which would indicate that 170 years more should see the work finished. In the Philippines, however, 61 per cent of the work has been done in the past 16 years, and at this rate of progress ten years more will see the completion of the island water surveys. The secret lies in the fact that the Insular Government has provided four survey ships and ample funds to keep them steadily employed.

The East Asiatic Company's M. S. "Selandia" in Pedro Miguel lock. A U. S. Navy collier is tied up against the approach wall in the rear. The "Selandia" is moving towards the Pacific.

THE "JULIA LUCKENBACH" LAUNCHED

The "Julia Luckenbach," launched December 23, 1916, is the second of a fleet of five large oil-burning freighters now under construction by the Fore River Shipbuilding Corporation for the Luckenbach Line of New York to engage in the general carrying trade. The "Edward Luckenbach," the first vessel built under the contract, left the Fore River yards five weeks ago, having fulfilled every requirement in her trials.

The "Julia Luckenbach," like the other vessels of the fleet, was constructed to special designs for the Luckenbach Steamship Company for its coast to coast and oversea's trade. Her length is 456 feet over all, and she has a deadweight carrying capacity of 10,000 tons. In the adoption of the modified cruiser stern, the novel arrangement of bridge and deck-house bulwarks, one large smoke-stack amidships, she is a handsome vessel of distinctive appearance. Her wide spaced frames are specially designed for the economical carriage and rapid handling of freight.

The vessel is driven by a single Curtis turbine, with high and low speed reduction gears designed to deliver 4,000 h. p. at 90 revolutions, the turbine being so arranged that the ahead and reverse turbines are carried on one shaft and contained in one case. Steam is furnished by three boilers of the Scotch marine type, the fuel oil being carried in the double bottom compartments and in the forward and after peak tanks.

LIGHTHOUSE TENDER "CEDAR"

This single screw steamer was launched at the yards of the California Shipbuilding Company, Long Beach, California, on December 27.

The "Cedar" is 200 feet 8 inches over all, 36 feet moulded beam, and 18 feet 6 inches depth, and at 13 feet draft has a displacement of 1,750 tons. The "Cedar" is an oil burner, steam being furnished by two Scotch boilers at 190 pounds pressure. She will have a vertical triple expansion engine with cylinders 20, 32½ and 55 inches by 39 inches stroke. There will be a large distiiling and evaporating plant on board, also two turbo-driven electric sets of 10 and 15 k. w. capacity respectively. A steam windlass, capstan and hoisting engine will be fitted and there will be a fifteen-ton derrick on the foremast. The "Cedar" will go on the Alaskan station when completed.

BIG DOUBLE LAUNCHING

There was a double launching at the Alameda plant of the Union Iron Works on January 20. A ten thousand ton freighter, sister ship to the Talabot, recently launched from the same yard, took the water first and was followed half an hour later by the Regulus, a 6,000 ton freighter. This double launching, while not simultaneous recalls the launching of the gunboats Marietta and Wheeling at the Union Iron Works in 1896. These two vessels were launched from parallel ways at the same moment and while their rudders were set to swing them apart, they collided. This incident was vividly recalled when the collision occured between the British cruiser Hawke and the White Star steamer "Olympic." This collision being caused by the affinity that exists between two moving objects running through the water parallel to each other.

LAUNCH OF THE "OREGON"

The launching of the first of the Alaska-Pacific Navigation Company's big motor ships, the "Oregon," took place towards the close of the month at the Nilson and Kelez shipward, Seattle. This vessel is 216 feet between perpendiculars, 42 feet beam and 23 feet 7 inches moulded depth. She will be powered with two 625 b. h. p. Southwark-

Launch of the "Thordis" at the Oakland plant of the Moore and Scott Iron Works.

Harris heavy oil engines. The "Oregon" will be the first freight and passenger motorship to be built on this coast. She will have accommodations for eighty cabin passengers and forty in the steerage. Her lumber carrying capacity will be 1,500,000 feet. Her owners intend to operate the vessel in the Alaskan trade unless tempted off shore by some exceptional charter.

LAUNCH OF THE "THORDIS"

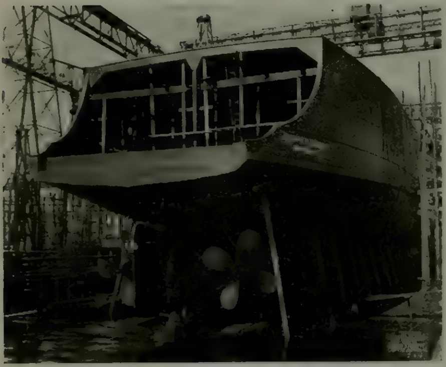
On January 6, the Moore and Scott Iron Works launched their second large freighter, the "Thordis," the craft being christened by two little granddaughters of Henry T. Scott, president of the Moore and Scott Iron Works. The "Thordis" is a 7,100 tons d. w. carrier 376 feet between perpendiculars, 52 feet 3 inches beam, and 28 feet moulded depth. She will be driven by General Electric-Curtis geared turbines of 2,400 h. p., steam being supplied by three Scotch boilers. The "Thordis" is booked for delivery on February 28.

SUBMARINE LAUNCHED

The submarine N-1, the first of the "N" class, was launched at the yards of the Seattle Construction and Dry Dock Company on December 30. This craft is of 412 tons displacement, and is equipped with a pair of 450 h. p. Diesel engines for surface running. She can run for 60 continuous hours when submerged, and has a surface radius of 2,500 miles. The N-2, a sister submarine, was launched on January 16, and the N-3, the third submarine on hand at the big Seattle shipbuilding plant, will be put overboard in February.

The "Julia Luckenbach" taking the water at the yards of her builders, the Fore River Shipbuilding Corporation.

A Busy Year at Eastern Yard



The stern of the "Joseph R. Parrott," the big car ferry operating to Havana, Cuba.

WHILE the shipyards along the Pacific Coast have been flooded with orders, an equal congestion has occurred on the East coast, many of the yards making a new record for yearly output during 1916. Among the yards who have a large tonnage to their credit during the year just closed is the Wm. Cramp Ship and Engine Building Company of Philadelphia, the oldest of the large number of yards which have caused the Deleware river to be referred to as the American Clyde.

The accompanying photographs and brief descriptions of the craft delivered by the Cramp yard during 1916 give a fairly comprehensive idea of the output of this famous American shipyard.

U. S. Torpedo Boat Destroyer "Porter."

Torpedo Boat Destroyer No. 59, U. S. S. "Porter," was the fifteenth torpedo boat destroyer of this general type which has been constructed by the Cramp Company for the United States Government, and was delivered to them on April 17, 1916.

The vessel is similar in general to the torpedo boat destroyers "Aylwin," "Parker," "Benham" and "Balch," already built and successfully tried and delivered to the Government, but constructed on somewhat a larger scale, and is similar to the "O'Brien," "Nicholson," and "Winslow," already successfully tried and delivered, and is a sister ship to the "Conyngham," recently commissioned.

The "Porter" is a complete steel vessel, built of the highest grade of steel for construction made in this country, certain portions being made of high tensile steel, which is only used where stresses are to be provided against with material of the lightest character.

The following are the general dimensions:

Length b. p.		310′
Length, overall		315′
Beam, moulded		29′ 10″
Beam, extreme		30′ 6½″
Trial displacement	Tons	1090
Trial draft		9′ 4½″

The vessel is propelled by twin screws driven by turbine engines of the Parsons marine type. Steam is furnished by four White-Foster water tube boilers. The contract speed is 29½ knots per hour.

The vessel has a battery of four 4-inch r. f. guns; four 6.8 m. twin deck torpedo tubes.

Special care has been given to the design of the constructional work, in order to obtain the greatest amount of strength and durability on the least weight.

The accommodations and quarters are fitted up in light steel structural material, as much attention being given to the comfort of the officers and crew as is practicable in a vessel where the amount of available space is necessarily cut down to its lowest limits.

Reports from the fleet of torpedo boats now in service show that the boats built by the Cramp Company are exceedingly strong and seaworthy, and always ready for service under all conditions of weather when it is possible for a torpedo boat to go out.

U. S. Torpedo Boat Destroyer "Wilkes"

Torpedo Boat Destroyer No. 67, U. S. S. "Wilkes," was the sixteenth torpedo boat destroyer of this general type which has been constructed by the Cramp Company for the United States Government, and was delivered to them on November 10, 1916.

The vessel is similar in general to the torpedo boat destroyers "Aylwin," "Parker," "Benham," "Balch," "O'Brien," "Nicholson," "Winslow," "Conyngham" and "Porter," already tried and delivered to the Government, but constructed somewhat on a larger scale.

The "Wilkes" is a complete steel vessel, built of the highest grade of steel for construction made in this country, certain portions being made of high tensile steel, which is only used where stresses are to be provided against with material of the lightest character.

The following are the general dimensions:

Length b. p.		310′
Length, overall		315′
Beam, moulded		29′ 10″
Beam, extreme		30′ 6½″
Trial displacement	Tons	1110
Trial draft		9′ 4½″

The vessel is propelled by twin screws driven by turbine engines of the Parsons marine type. Steam is furnished by four White-Foster water tube

Bow view of the "Joseph R. Parrott." This big, ocean-going ferry transfers thirty loaded freight cars at a trip.

The Torpedoboat Destroyer "Wilkes" on a trial run, September 30, 1916.

The "Sunoil," a fine tanker, constructed by the Wm. Cramp Ship and Engine Building Company to the order of the Sun Company.

boilers. The contract speed is 29½ knots per hour.

The vessel has a battery of four 4-inch r. f. guns; four 6.8 m. triple deck torpedo tubes; two 1-pdr. automatic anti-balloon guns.

Special care has been given to the design of the structural work in order to obtain the greatest amount of strength and durability on the least weight.

The accommodations and quarters are fitted up in a light steel structural material, as much attention being given to the comfort of the officers and crew as is practicable in a vessel where the amount of available space is necessarily cut down to its lowest limits.

Reports from the fleet of torpedo boats now in service show that the boats built by the Cramp Company are exceedingly strong and seaworthy, and always ready for service under all conditions of weather when it is possible for a torpedo boat to go out.

"J. M. Danziger"

The "J. M. Danziger" is a single screw bulk oil steamer built by the Cramp Company for the Pan American Petroleum and Transport Company, and was delivered to them on August 16, 1916.

This vessel was built on the Isherwood system to Lloyds' highest classification, and has two complete steel decks from stem to stern, with raised forecastle, bridge and poop decks.

The principal dimensions are as follows:

Length overall	446′ 0″
Length (Lloyds)	430′ 0″
Beam, moulded	58′ 0″
Depth of main deck, moulded	25′ 4″
Speed	11 knots
Carrying capacity	10,000 tons

The hull of the vessel is built of steel throughout, the pilot house and interior of living quarters only being of wood. The vessel is schooner rigged, having two steel masts, with wood topmasts, and four cargo booms (two on each mast).

A steel deck house will be erected on bridge deck for the accommodation of the captain and deck officers. A steel house will be built on the poop deck for the accommodation of officers and petty officers' mess rooms. Accommodations are provided in the after part of the ship for chief engineer, assistant engineers, petty officers, firemen and crew.

The living quarters throughout are fitted in first class style, and provided with every convenience, such as first class plumbing, heating systems, electric lights, first class galleys, pantries, and mess rooms, with suitable cold storage accommodations and two-ton ice plant for refrigerating same.

The propelling machinery will consist of a vertical, inverted, triple expansion engine, having cylinders 27″ x 45½″ x 76″ in diameter with 51″ stroke.

Steam will be provided by three single-ended Scotch boilers, fitted with heated force-draft, and so arranged that either coal or oil can be used as fuel.

Two pumps of heavy pattern are provided for handling the bulk-oil cargo, with a complete system of piping and valves for stowing and unloading oil from every compartment throughout the vessel.

This vessel, which is one of two constructed at Cramp's shipyard, is one of the finest bulk-oil steamers in the oil carrying trade.

S. S. "Jalisco" and "Coahuila"

The "Jalisco" and "Coahuila" are passenger and freight vessels constructed by this company for the Mexican Navigation Company, and are to ply between New Orleans and Gulf ports in Mexico.

The vessels are of the two-deck type, with forecastle and long bridge, fitted with double bottom.

The general dimensions of the ships are as follows:

Length overall	317′ 0″
Length, b. p.	305′ 0″
Beam, moulded	45′ 0″
Depth	22′ 8″
Displacement	5600 tons

They are schooner rigged with two polemasts, fitted with cargo derricks, built with single screw, and fitted with one smoke stack.

The superstructures amidships will contain staterooms for first class passengers, 50 in number; also first class dining saloon, pantry, galley, social hall, smoking room and suites.

On the boat deck will be provided the deck officers' and engineers' quarters.

As the vessels are to be operated in semi-tropical waters, awnings are fitted over the passenger spaces and general quarters.

The propelling machinery consists of one triple expansion engine with cylinders 20″ x 33″ x 55″ x 36″ stroke. Steam will be provided by two single-ended Scotch boilers, fitted with heated forced draught, burning fuel oil.

The vessels are provided with up-to-date electric plants and steam auxiliaries, including steam and auxiliary hand steering gear.

The vessels have been designed with a view to providing as great carrying capacity and as much comfort and habitability for passengers as is possible on ships of this character.

The "Jalisco" was delivered to its owners on April 6, 1916, and the "Coahuila" was delivered May 30, 1916.

"Santa Barbara"

This steamship was constructed by the Cramp Company and delivered to her owners, The Atlantic and Pacific S. S. Company, on January 27, 1916.

The "J. M. Danziger" leaving the Cramp shipyard. This is a fine example of the American tanker.

This vessel will trade with Pacific Coast ports, through the Panama Canal.

The vessel is of the following general dimensions:

Length, overall	420′ 0″
Beam, moulded	54′ 0″
Depth, moulded	36′ 9″
Tonnage, statutory (net)	4,008
D. W. capacity (about)	10,000
Displacement	12,100
Speed	13 knots
Block coefficient	.75

The vessel is built of the shelter deck type on the Isherwood system of longitudinal framing and to Lloyds' highest class of registry. They have large, clear holds, with extra large hatchways, for carrying timber. There are four hatches, served by ten 7-ton derricks, six 5-ton derricks, and one 30-ton derrick, so arranged as to best handle the cargoes carried by the vessel in its trade. These derricks are operated by double winches of the latest Williamson type, mounted on derrick tables. The deck machinery also includes windlass and steering gear of the latest steam-operated American Engineering Company's type. The steering gear is placed in a house on poop deck, and controlled by telemotor from the pilot house and bridge.

The propelling machinery is of the quadruple expansion type, with cylinders 25½″, 37″, 52½″ and 76″ dia. by 54″ stroke, steam being supplied by three large boilers working at 220 lbs. pressure, fitted for burning oil fuel on the Howden system, or alternatively either coal or oil.

Oil is carried in deep tank to the extent of 1,000 tons. The auxiliary machinery comprises a large forced draught fan with duplicate engines, a large auxiliary condenser, powerful feed water injector, three Blake and Knowles special feed pumps, large navy type evaporator and exhaust feed heater by the Griscom-Russel Company, and several Worthington pumps, General Electric twin dynamos, refrigerating machinery, workshop with lathe and drill press. Direction and speed indicators, etc.

A searchlight is fitted on the upper bridge, and there are powerful electric lights at each side of the mast for cargo working purposes.

A large deck house amidships contains all the accommodations for officers, engineers, stewards, dining saloon, mess rooms, pantry, galley, etc., and six spare rooms. On the bridge deck over the dining saloon is a large house for captain, pilots, etc., and above this is the navigating bridge, with wheel house, chart room and wireless room. The crew are berthed aft in the poop, with lavatories, shower bath, separate rooms for seamen, firemen, oilers and petty officers, and separate mess rooms for firemen and seamen.

This vessel was built under the supervision of Mr. D. Mathieson, the owner's marine superintendent.

"Sunoil" and "Wm. Rockefeller"

The "Sunoil" and "Wm. Rockefeller" are single screw bulk oil steamers built by the Cramp Company for the Sun Company. The "Sunoil" was delivered to its owners on October 10, 1916, and the "Wm. Rockefeller" was delivered about December 29, 1916.

These vessels are built on the Isherwood system to Lloyds' highest classification, and have two complete steel decks from stem to stern, with raised forecastle, bridge and poop decks.

The principal dimensions are as follows:

Length, overall	446′ 0″
Length (Lloyds)	430′ 0.
Beam, moulded	58′ 0″
Depth to main deck, moulded	25′ 4″
Speed	11 knots
Carrying capacity	10,000 tons

The hulls of the vessels are built of steel throughout, the pilot house and interior of living quarters only being of wood. The vessel is schooner rigged, having two steel masts, with wood topmasts, and four cargo booms (two on each mast).

A steel deck house is erected on bridge deck for the accommodation of the captain and deck officers. A steel house is built on the poop deck for the accommodation of officers' and petty officers' mess room. Accommodations are provided in the after part of the ship for chief engineer, assistant engineers, petty officers, firemen and crew.

The living quarters throughout are fitted in first-class style, and provided with every convenience, such as first class plumbing, heating system, electric lights, first class galleys, pantries, and mess rooms, with suitable storage accommodations and a two-ton ice plant for refrigerating same.

The propelling machinery consists of a vertical, inverted triple expansion engine, having cylinders 27" x 45½" x 76" in diameter with 51" stroke.

Steam will be provided by three single-ended Scotch boilers fitted with heated force-draft, and so arranged that either coal or oil can be used as fuel.

Two pumps of heavy pattern are provided for handling the bulk oil cargo, with a complete system of piping and valves for stowing and unloading oil from every compartment throughout the vessel.

These vessels are two of the finest bulk-oil steamers in the oil carrying trade.

"Joseph R. Parrott"

In building the Florida East Coast Railway it was the dream of Mr. Henry M. Flagler to carry this road through to Key West and incorporate a freight service direct between the United States and Cuba. To do this it was necessary to transfer the loaded freight cars from Key West to Havana. As there is a strip of some 96 miles of ocean between the two points, the only possible way is by means of a car ferry line.

This dream became a realization when the William Cramp and Sons Ship & Engine Building Company delivered the "Henry M. Flagler" on January 2, 1915, which has since proved most successful in this service. The second vessel, the "Joseph R. Parrott," which was built by this company to augment the car ferry service between Key West and Havana, was delivered to that company on October 29, 1916.

This vessel has a capacity of 30 of the largest loaded freight cars, and will make the trip between Key West and Havana in eight hours.

The general dimensions are as follows:

Length, overall	350 feet
Length, b. p.	337 feet
Beam, moulded	57 feet
Depth	22 feet
Breadth of Deck	57 feet
Speed, loaded with 2,300 tons deadweight.	12 knots

The hull is built of steel, conforming in every respect to the rules of the Bureau Veritas for a vessel of this special class.

The cars are carried on the main deck, which is fitted with four railroad tracks. The stern of the vessel is of such shape as to fit neatly in the docks provided at Key West and Havana, whereby the cars are loaded on to the vessel at the stern. Every appliance has been fitted for the securing of the cars at sea. When the cars are stowed, the weight of the cars is taken upon jacks fitted to jack rails, thus relieving the trucks from the surge and weight due to the rolling of the ship in a seaway.

On the shelter deck provision is made for the quarters of the officers and crew.

The machinery consists of two triple expansion reciprocating engines of standard marine design, having cylinders 20", 32½" and 54", by 36" stroke. The engines are to develop 1,350 h. p. at 100 r. p. m.

The boilers are of the Scotch type, being single-ended return tubular cylindrical boilers 13' 2" diameter by 12' long, fitted with two furnaces 48" in diameter of the corrugated type.

The vessel is fitted with an electric light plant, mooring winches actuated by electricity, and winches for handling cargo.

Two deep tanks of 600 tons capacity for carrying molasses are also provided with necessary pumping apparatus for handling this cargo. Certain portions of the vessel are fitted with double bottom for feed water, with large ballest tanks in case the vessel is running light.

The Torpedoboat Destroyer "Porter" running at 28 knots.

The Ship of the Future

By D. W. & R. Z. DICKIE

THE vessel of the future will be the full powered motorship, and this is evidenced by the fact that Burnmeister & Wain of Copenhagen have orders for motor vessels for delivery ten years hence.

In order to follow the procession of progress, ship owners who are building ships for the future will build full powered motorships, fitted with Diesel engines operating on the full Diesel principle.

Many large firms are now building Diesel engines of the four cycle type, and consequently in time competent engineers will be trained, and the Diesel type of ship will be considered far more reliable than a steamer.

There is quite a flurry on this coast at the present time in the building of auxiliary ships, but these will not be able to compete with the steam tramps that are now interned, as their cargo capacity is very limited in comparison, and the tramp steamer can be operated at almost the same cost with foreign crews; besides, in many cases the first cost of these vessels was much less than what the auxiliary ships are costing, and in some cases this cost is already written off.

The small auxiliary ship has a value which will never be encroached upon by a larger vessel, for it can secure charters to carry lumber or freight to shallow ports where a larger vessel could not enter, and whose time would be too valuable to admit of slow discharging, which is necessary in some ports where the freight is taken away from the vessel very slowly, due to inadequate facilities for handling it after it leaves the deck or hold.

With the Diesel engine, the space required is small compared with that of the steam plant, and also, the amount of fuel, and consequently the cost of fuel is much less. Therefore in designing a ship for the use of this power it would seem that the logical thing to do would be to power the ship up to its economical limiting speed.

It is only a question of time when steamers and motorships will operate all their cargo winches electrically, as a careful investigation of the subject with actual test has shown quite a saving.

From actual tests it costs $12.00 per thousand tons to hoist cargo with coal, $7.00 per thousand tons to hoist cargo with oil fuel, and $2.00 per thousand with electricity, the reason being that the steam winches are very expensive to operate on account of the large amount of steam they use.

The right thing to do in the construction of large ships is to build them of steel, but, owing to the scarcity and the delay in getting the material, a wooden hull can be built which will answer the purpose at present. These hulls should be as deep as possible, limited only by the draft of the water of the harbors which they run to, and should be diagonally strapped, and very carefully constructed.

Herewith is an outline sketch of a full powered wooden Diesel freighter, equipped with twin screw Diesel engine, which will have a sea-speed of about ten knots with the cargo of 4,000 tons.

A compromise stern has been adopted, this type of construction giving a simple and strong hull.

This vessel is 300 feet long by 48 feet beam and a depth of 30 feet, the idea in the depth being to give the vessel strength instead of using internal trusses to accomplish the same object; thus destroying the cargo stowage.

In order to accomplish the effect of a deep floor, which greatly adds to the strength of the vessel, the proposed midship section will show that the bottom is built on the principle of a truss.

The vessel will be fully equipped with steam winches and a donkey boiler, so that it could unload with steamer dispatch in any port.

An approximate estimate has been made on the cost of such vessel at the present time, and the figures are as follows:

FIRST COST AND COST OF OPERATION OF FULL POWERED MOTOR-SHIP—300 FEET OVER ALL, 48 FEET BEAM, 30 FEET HOLD, 1,600 HORSE-POWER

Hull, joinerwork and deck equipment			$248,000
Donkey boiler, four winches, anchor windlass, capstan, fuel tanks, water tanks and installation			38,000
Main engines, shafting and installation			300,000
Auxiliary plant, fire pumps, electric lights, compressor and installation			5,555
Total first cost			$591,555
Interest, 6 per cent		$35,493	
Depreciation, 6 per cent		35,493	
Insurance, 6 per cent		35,493	
Fixed Charges			$106,479
Crew—			
Captain	$225		
1st Mate	115		
2nd Mate	100		
3rd Mate	90		
Watchman	60		
Chief Engineer	165		
1st Assistant	115		
2nd Assistant	105		
3rd Assistant	95		
Cook	80		
2nd Cook	60		
2 Boys, $40 and $35	75		
12 Sailors	660		
	$1,945 x 12		$ 23,340
Food—25 men for 365 days @ 70c a day			6,390
Fuel—4 voyages a year—			
275 days at sea, 76 bbls. a day @ $1		$20,900	
90 days in port, 42 bbls. a day @ $1		3,780	
			$ 24,680
Lubricating oil—265 bbls. @ $35			9.300
Pilotages—			
16 @ $90		$1,440	
8 @ $45		360	
			1,800
Coal—12 tons @ $12			144
Shipchandlery			2,000
Laundry			150

Water		200
Association		420
Hardware, paints and oils, etc.		1,600
Stevedoring—		
Lumber on	$6,160	
Lumber off	6,160	
Coal on	9,600	
Coal off	16,000	
		37,920
Tolls, wharfage and dockage		1,500
Drydocking and painting		1,400
Commissions and brokerage		3,400
Advertising		110
Telegrams		160
Tugs and launch hire		275
Custom House		160
Incidentals		1,000
Total expense		$222,428
Freight for 4 voyages—		
Lumber from Portland to Sydney, 115 shillings		$279,450
Coal, Australia to Honolulu, 35 shillings		136,080
Income		$415,530

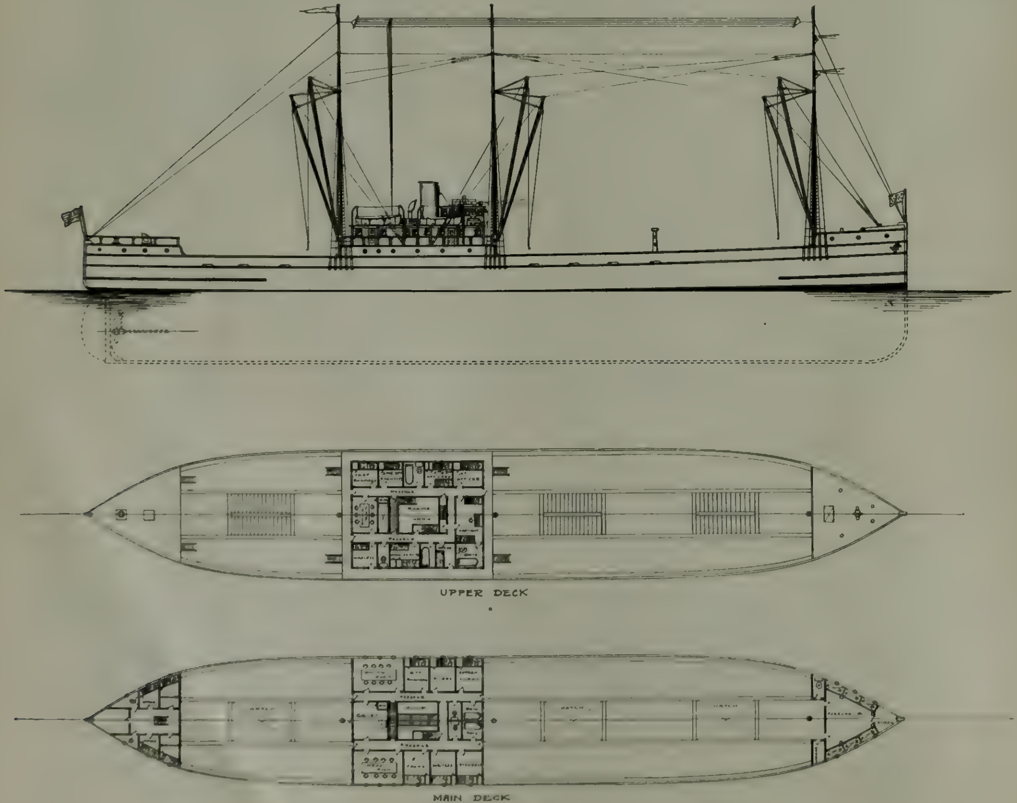
It will be seen that during one voyage the vessel has carried 8,000 tons, and during the year she would make four voyages, carrying 32,000 tons, at a cost of $6.95 per ton.

In order to compare the earning capacity of an auxiliary ship with this proposed type of motorfreighter, the following comparison is given.

Taking an auxiliary schooner about 280 feet over all, 48 feet beam, and 20 feet deep, fitted with twin screw of about 350 h. p. each, the cost would be as follows:

FIRST COST AND COST OF OPERATION OF AUXILIARY SCHOONER 280 FEET LONG, 48 FEET BEAM, 20 FEET HOLD, 700 HORSE-POWER

Hull, sails, joinerwork and deck equipment			$154,300
Donkey boiler, two winches, anchor windlass, capstan, fuel and water tanks, and installation			24,900
Main engines, shafting, and installation			87,500
Auxiliary plant, fire pumps, electric lights, compressor, and installation			5,555
Total cost			$272,255
Interest, 6 per cent		$16,335	
Insurance, 6 per cent		16,335	
Depreciation, 6 per cent		16,335	
Fixed charges			$ 49,005
Crew—			
Captain	$225		
1st Mate	115		
2nd Mate	100		
3rd Mate	90		
Watchman	60		
Chief Engineer	165		
1st Assistant	115		
2nd Assistant	105		
3rd Assistant	95		
Cook	80		
2nd Cook	60		
2 Boys, $40 and $35	75		
12 Sailors	660		
	$1,945 x 12		$23,340
Food—25 men for 365 days @ 70c a day			6,390



Profile and deck plans of a proposed full-powered wooden motorship.

Fuel—		
293 days at sea @ 35 bbls. per day @ $1.	$10,255	
72 days in port, 21 bbls. per day @ $1..	1,512	
		11,767
Lubricating oil—129 bbls. @ $35		4,515
Pilotages—		
12 at $67	$804	
6 at $25	150	
		954
Coal—12 tons @ $12 a ton		144
Shipchandlery		2,000
Laundry		150
Water		200
Association		420
Hardware, paints, oils, etc.		1,600
Stevedoring—		
Lumber on	$3,600	
Lumber off	3,600	
Coal on	4,500	
Coal off	7,500	
		19,200
Tolls, wharfage, and dockage		1,500
Drydocking and painting		1,400
Commissions on brokerage		2,600
Advertising		100
Telegrams		150
Tugs and launch hire		275
Custom House		150
Incidentals		1,000
Total expenses		$126,860
Freight for three voyages—		
Lumber from Portland to Sydney, 115 shillings		$167,670
Coal from Australia to Honolulu, 35 shillings		63,787
Income		$231,457

During the year the vessel made three voyages, carrying 16,923 tons, at a cost of $7.50 per ton.

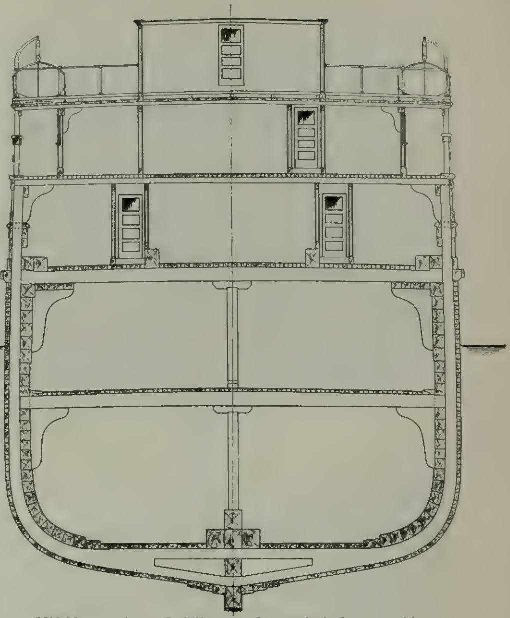
It will be noticed that the full-powered motorship, with a speed of 10 knots, carried the freight cheaper than an auxiliary vessel, even using the same freight rate, and with a faster ship it is probable that better rates could be obtained than with the auxiliary. Also, the full powered ship will get better dispatch at both ends of her run.

With particular reference to the comparison of the full powered vessel and the auxiliary vessel with the small power, the experience drawn from the trading on the Pacific Coast must be taken into account, that is, in order to get up the coast more power is required than the theoretical amount, for the reason that the prevailing wind on the coast is from the northwest, and the vessels are going up light against it.

This means that they are held up sometimes for days bucking into unfavorable weather when they are in the worst possible condition as regards comfort at sea, flying light, and pounding themselves, due to the small draft forward.

The steam schooner on the Pacific Coast is made fine in block co-efficient to get her down in the water for the trip up the coast, in order that she may "hold on," and not pound so badly as the earlier ones which were made fuller.

In the near future it is not unlikely that the reduction gear which has proved so successful when used in connection with a high speed turbine will be used in conjunction with a high speed Diesel engine, which will admit of small cylinders with less weight and smaller space, besides a reduced first cost.



Midship section of full-powered two-decked motorship.

The spare parts for these engines will be small, and easily stowed and carried, in places in the ship which could not otherwise be used to advantage, and can be quickly and easily handled in case of trouble at sea.

It is interesting to note that in the last annual report of the East Asiatic Company that all steamers are to be dispensed with as soon as they can be replaced with Diesel driven, full power motorships.

This company, after paying its shareholders a dividend of about 30 per cent, and bonuses to its directors and employees, has built up an immense reserve fund.

Henry S. Grove resigned as President of the Wm. Cramp and Sons Ship and Engine Building Works at the January directors meeting, Albert Strauss and Francis L. Hine, New York bankers, having resigned from the directorate several weeks ago. During Mr. Grove's incumbency, the bonded debt hanging over the Cramp yard was reduced from $5,000,000 to $1,000,000. The reason for terminating his connection with the concern whose destinies he has guided for thirteen years, was his desire to be relieved from the complicated duties devolving on his office.

The "Tempaisan Maru," one of the Mitsui fleet. Vessels of this character constitute what is most needed today.

The "Santa Rosalia," a "Maple Leaf" boat well known on the West Coast, where she was a regular visitor before the war.

The "Herschel," one of the best examples of the big list of freight and passenger boats in the Lamport and Holt Lines.

A big steam yacht under course of construction at the Pusey and Jones plant.

Extensive Improvements at Delaware Yard

THE Delaware river, serving as a water artery to one of the most important manufacturing districts of the United States, boasts of a larger water borne commerce than any other river in America, with the possible exception of the Mississippi. A second distinction belongs to the Delaware, a distinction which it still maintains despite the wonderful development in other centers, and that is the premier place in American shipbuilding. The New York Shipbuilding Corporation, the Wm. Cramp Ship and Engine Works, the Sun Shipbuilding Company, the Chester Shipbuilding Company, the Pennsylvania Shipbuilding Company are all launching large freighters or oil carriers into the Delaware, indeed over thirty per cent of the steel shipbuilding in this country is taking place along the banks of this historic river.

The preeminent position of the Delaware is not confined to the larger yards, however, and about thirty miles south of Philadelphia on the banks of the Christiana river about one and one-quarter miles from that stream's confluence with the Delaware, we find the justly famous yard of Pusey and Jones. This concern has held an enviable reputation for high class workmanship and design in moderate sized steam and sailing vessels and large and small steam and sail yachts. Here was constructed the first iron sailing vessel built in the United States, the "Mahlon Betts," another notable example of Pusey and Jones workmanship was the America's cup defender "Volunteer."

Recently the Pusey and Jones plant has been reorganized and enlarged. New building ways have been laid down and across the head of the building berths has been built a splendid new ship tool shed. This building has been designed with the view to facilitating the progress of material from its arrival at the yard to its final placing on the hull of vessels building on the berths. New and costly tools have been installed and handling equipment for the rapid transportation of plates and shapes from storage to the punches, shears and bending rolls and from hence to the hulls for which they are intended. The upper floor of the new building is given over to a splendid mould loft and a large well lighted draughting room.

In all about 350 vessels have been built at this well known Delaware river yard and the concern has always been held in the highest esteem among shipowners and in the engineering and shipbuilding fraternities.

Laying out berths for new construction at the Pusey and Jones plant, Wilmington, Deleware.

The new ship ways and the new ship tool shed of the Pusey and Jones plant.

The handsome steam yacht "Lydonia," a product of the Pusey and Jones plant.

The upper floor of the new ship tool shed at Pusey and Jones' is utilized as a mould loft, one end being set aside for the draughting room.

REORGANIZATION OF THE McEACHERN SHIP COMPANY

Mr. A. Reimann, the New York manager of the firm of A. O. Andersen and Company (and who is also president of the Portland corporation of that firm) is spending the winter in the Northwest. Upon his arrival on this coast at the end of October, 1916, he bought the controlling interest in the McEachern-Standifer-Clarkson Ship Company from Messrs. Standifer and Clarkson, whereas Mr. McEachern was retained as general manager of the shipyard and a shareholder. Later on, an arrangement was made between Mr. McEachern and the Andersen interests by which the latter bought Mr. McEachern's interest, that gentleman discontinuing the management and retiring from the business; the name McEachern Ship Company, however, being retained by the new company.

Mr. A. Reimann continues to be the president of the McEachern Ship Company, while the general management for the time being is in the hands of Mr. G. M. McDowell (manager of A. O. Andersen and Company in Portland) and Mr. C. A. Coolidge, who was previously the representative of A. O. Andersen and Company in the yard, is assistant manager.

The financial affairs of the company have been reorganized and the yard is now building for its own account or for the account of Messrs. A. O. Andersen and Company, six vessels of which the first, the "Astoria," is now ready for delivery. The other vessels will be completed at intervals of about one month.

Following the launching of ship No. 2, about ten days ago, the keel for the McEachern Ship Company's seventh vessel was laid.

AMERICAN SHIPBUILDING IN 1916

The Bureau of Navigation, Department of Commerce, reports that during the calendar year 1916 private American shipyards built 1163 merchant vessels of 520,847 gross tons, which have been officially numbered for American shipowners and accordingly are now in trade or about to engage in trade.

American shipbuilders also built 50 vessels of 39,392 gross tons for foreign owners, making a total output of 1213 vessels, of 560,239 gross tons, for the 12 months. The record output for the United States was 614,216 gross tons, built during the 12 months ended June 30, 1908, and the 1916 record was also exceeded during the fiscal year 1855 when 583,450 gross tons were built, all of wood except seven iron vessels of 1891 gross tons.

Of the 1916 output 152 vessels, of 414,029 gross tons, were built of steel, which was exceeded by the output of 149 steel vessels, of 450,017 gross tons, during the fiscal year 1908. The output of that year, however, was mainly for the Great Lakes, while most of the steel tonnage of 1916 has been built for the ocean foreign trade.

"RYDER HANIFY" LAUNCHED

The steam schooner "Ryder Hanify" was successfully launched at the W. F. Stone shipyard, Oakland, California, on January 22nd. This fine steamer is 233 feet long over all, 43 feet beam and 17 feet 6 inches depth of hold. A complete description of this vessel and her sister ship which will be launched during February, appeared in the November (1916) issue of the Pacific Marine Review. The Ryder Hanify will be driven by a triple expansion engine of 1000 h. p. with cylinders 15½ by 26 and 43 inches in diameter by 33 inches stroke. Steam will be supplied by B & W boilers. The engines were built and are now being installed by the Main Street Iron Works, San Francisco.

SHIPBUILDING NOTES

The freighter "Felix Taussig" was launched at Newport News on January 13. She has a gross register of 5900 tons, speed 10 knots, and is built to the order of the Crowell and Thurlow Steamship Company of Boston.

The Clooney Construction Company of Lake Charles, Louisiana, has booked an order for a steel hull 208 by 41 by 19 feet moulded dimensions for the Gulf Export and Transportation Company of Beaumont, Texas.

The four-masted barkentine "Herdie" was launched on January 9 from the shipyard of the Richard T. Green Company of Chelsea, Massachusetts. The "Herdie" is 200 by 42 by 19 moulded, and has a deadweight capacity of 2900 tons.

The largest one-piece floating dry dock in the world was successfully launched at the Union Iron Works, San Francisco, on January 5. The dock is nearly 500 feet long and of 12,000 tons lifting capacity. Vessels up to 450 feet in length can be accommodated.

The Howard Ship Yards Company, of which Charles G. Brazier of New York is president, has been organized to take over the five shipyards of the old Howard Company. One of these yards is at Jeffersonville, Indiana, on which $1,000,000 will be spent. The other yards, at Cincinatti, Madison, Paducah and Mound City, will have $3,000,000 expended on them in additions and improvements.

The National Shipbuilding Company of Seattle has been incorporated for $40,000 by F. C. Norbeck and O. D. Trieber.

The Scandinavian Ship Building Company of Seattle has been incorporated for $500,000 by J. W. Bowerman and Carl W. Isakson.

Marconi Duplex sending station, Kahuku, Hawaiian Islands. Messages are flashed to Japan (over 5000 miles) and to California (over 2000 miles) from this station simultaneously.

The United States-Japan Wireless Service

BEHIND the announcement that the wireless service established between the United States and Japan by the Marconi Wireless Telegraph Company of America was inaugurated on November 15th lies a story of overcoming seemingly insurmountable difficulties; of the accomplishment of engineering feats which apparently defied the most skilled efforts; of the battling with nature in remote climes and finally the resultant triumph—the forging of another link in the world-wide radio chain and the unlocking of other gates to the commerical world of the Orient.

The history of the United States-Japan service began about four years ago, when the idea of encircling the world with radio stations was evolved. Not even a rumble of the great European war was being heard at that time, but the advantages of a wireless chain in time of war were pointed out, attention being called to the value of the system in the event of the severing of the cables. Then followed an exhaustive investigation by the English post-office authorities, who at length reported that the Marconi system was the one to utilize in the project. The reason for this choice, it was explained, was that this system alone could provide the required service with proven reliability of operation.

The execution of the plan having been decided upon, the far-reaching machinery of the Marconi system was immediately set in motion. The American Marconi Company was called upon to build the following units: Trans-Atlantic stations at New Brunswick and Belmar on the New Jersey coast to send and receive messages to and from corresponding stations in Great Britain; sending and receiving stations respectively at Bolinas and Marshall, California, linking the Pacific coast with the Hawaiian stations, Kahuku and Koko Head; two similar stations in the Philippine Islands, and receiving and transmitting stations at Marion and Chatham, Massachusetts, to connect in Norway with Stavanger and Naerbo.

Extensive industrial activity marked this herculean task, reaching from the Atlantic to the Pacific, from the Golden Gate to Hawaii. Station buildings, homes for engineers and operators, towering masts, intricate apparatus—these were built and transported until the dream of a globe-girdling wireless system began to assume tangible form.

One of the first difficulties that came up in con-

The Marconi duplex receiving station at Koko Head, Hawaiian Islands. Messages are here received from Japan and California simultaneously.

Power is generated by three 500 horse-power boilers in connection with three 500 h. p. generating sets.

nection with the construction of the stations was that of transportation of materials. Practically all of the structural steel and machinery for the Kahuku and Koko Head stations was conveyed by steamship from New York to the Port of Mexico, across the Isthmus of Tehuantepec, and thence by boat to Honolulu, the trip occupying about five or six weeks. The cement and lumber were shipped from California.

Koko Head, which was planned originally as the receiving station in Hawaii, and will be used as the demands of the service require it, is about ten miles east of Honolulu. There were two ways to transport the material to this point: Either by carting it by road, a plan which had many drawbacks because of the condition of the thoroughfare, or by transporting it by boat and unloading it on the beach. A trial of the latter plan was decided upon, and a consignment of steel was loaded on a small steamer, commanded by a Hawaiian, who had earned a reputation for skill in manoeuvring his craft in and out of the numerous difficult landings. A barge and a launch accompanied the steamer, for the latter could not be navigated over a bar on the route to Koko Head, and it was planned to unload the material on the barge and have the latter towed ashore by the small steam-propelled boat. All went well until the launch with the barge in tow tried to shoot through the breakers. The first line of rollers was passed in safety, but a short distance further on two large combers submerged the barge, and it sank. Thus ended the attempt to effect transportation by the sea.

Meanwhile the experiment of conveying the material by road was being tried. The caravan, laden until the wheels of the wagons creaked and groaned, started from Honolulu soon after midnight, and ran into a tropical rainfall after it had proceeded only a few miles. The road, which was built of red clay mud, softened, and became so slippery that the wagons could not be driven in a straight line, the rear wheels slipping off to one side wherever the surface of the thoroughfare sloped. As a result, material fell from the vehicles, parts of harness broke, wheels were put out of commission, and it was finally necessary to shift most of the loads, double up on the teams, and bring the material piecemeal to the site of the station. Notwithstanding this discouraging experiment, the trucking was continued by means of the road route, although the horse-drawn vehicles were discarded and automobiles substituted.

Koko Head, located on the Island of Oahu, the third in size of the Hawaiian group, is known as the dryest point on the island. The land is undeveloped, and is used only for cattle grazing, even the latter getting little nourishment from the scanty surface growths. In fact, they frequently perish because of the lack of fresh water. The inadequate water supply threatened to cause con-

The Kahuku duplex sending station is also controlled from this station.

siderable hardship among the engineers and station builders. It was found easy to obtain well water, but it ran about forty grains of salt to the gallon, which destroyed its value for drinking purposes, and, after scouring the hills in search of a supply, it was decided to distill all water.

From the operating house as a center, the San Francisco aerial extends southwestward, carried on five 330-foot masts to an anchorage. The Japan aerial extends from the operating house almost due east. The first two masts are of the standard sectional type, 430 feet in height, the first being on level ground and the second on a hillside. From the latter point the aerial makes a span of more than 2,000 feet to the top edge of Koko Head, an extinct volcano at an elevation of 1,194 feet above the sea level. Here there was not room enough to erect a sectional mast, only about 40 square feet being available for a self-supporting structural tower, 150 feet in height. The tail end anchorage is far down on the inside of the crater. The balancing aerial, which is employed in both sets of antennae, is on self-supporting towers, each of which is 100 feet in height. The difficulty in erecting these masts was largely due to the fact that two of them and the anchorage were located in a pond, and it was necessary to sink caissons in order to lay the foundations.

The problems of construction at Kahuku, which is now being employed both as a sending and receiving station, were not as great as those at Koko Head, although the former is the largest wireless station in the world. From the power house the San Francisco transmitting aerial extends southwestward, supported by twelve masts, each of which is 325 feet in height; the Japanese aerial extends to the southeast supported by twelve masts, each being 475 feet in height. The subsoil at the station is made up of porous coral rock, and consequently considerable difficulty was experienced in putting down foundations for the power house and masts. In all of the excavations for the mast anchorage foundations were built water tight wooden cribs into which was poured concrete. Different sections of the site required different treatment, but generally the trouble was due to the presence of water in the subsoil, a factor, however, which added to the facility of operating the station, insuring a first class electrical "ground."

The task of constructing the Bolinas, California, station involved taking into consideration the fact that most of the material for erection purposes—the mast sections and wire rope for the eight masts, each 325 feet in height, and the steel work and machinery—was manufactured in the eastern part of the United States, and in order to transport it to Bolinas, which is about fifteen miles from San Francisco, it was sent from New York by boat to the Isthmus of Panama, across the Isthmus by rail, and thence by water again to San Francisco. As there is no railroad transportation available from the latter city to Bolinas, it was necessary to ship a considerable part of the material by water route from San Francisco, unload it at the wharf at Bolinas Bay, and haul it by motor trucks to the site of the station. A sand bar with a shallow opening through which the tide races obstructs Bolinas Bay, making it impossible for craft of considerable size to reach the wharf except during high tide. In addition to these handicaps, there was the necessity for rushing the work in order to make all the progress possible during the season of comparatively few storms.

As was the case at Koko Head, much difficulty was met with in obtaining a water supply. This was due to the fact that the ground is full of cracks, caused by earthquakes, and that the salt water from the Pacific seeps in. The solution of this vexed question was found, however, by damming a creek and installing a small pumping plant and a tank.

At Marshall, the receiving station, twelve miles north of Bolinas, on Tomales Bay, there were perhaps fewer obstacles to be overcome than at the other stations. The distribution of the construction materials was carried out from two points, a railroad from Sausalito, near San Francisco, providing transportation. Extension tracks were built on the southern boundary of the site, where all material for the buildings and the first two masts nearest these structures were unloaded and hauled away by motor trucks. The material for the remainder of the masts (there are seven in all, each 330 feet in height, was unloaded at the railroad siding at Marshall and hauled through the town and up a steep incline.

One of the most interesting features of the construction work was the erection of the steel masts. The mast is made up of steel cylinders, constructed in quarter sections flanged vertically and horizontally and secured together by bolts. Stayed with steel cables, these stand in a concrete foundation. Surmounting the main steel column was a wooden topmast, the lower part of which is squared and set in square openings in the plates between the steel cylinders. The hoisting arms attached to the upper end were fitted with blocks and hoisting cables. Attached to these arms were chain hoists which supported a square wooden cage for the workmen, which was lowered or raised as the demands of the work required while the sections were being bolted together.

The wooden topmast was the key note of this novel system of construction, operating like a man who pulls himself up by his bootstraps. The lower half of this topmast is of square section and is guided by a square hole in the diaphragm plates between each section. The topmast was fitted with a set of hoisting ropes. A square wooden cage was suspended from the hoisting arms by four chain hoists so that the workmen in it could move themselves up and down to bolt the sections together.

Assume that two cylinders have been bolted to the bed plate the mast rising through the center. The sections of the third cylinder were raised by a steam winch and bolted in place by the workmen. Then a heavy flexible steel rope was temporarily anchored at the top of this last cylinder. Attached to the top of the steel section, this cable led down inside the cylinders and around a wheel in the foot of the wooden topmast; then it was carried up again on the other side and around a sheave to the top of the steel, thence to the winch. By pulling on this rope the topmast was raised the length of one cylinder and pinned through holes in both steel and wooden masts. With the addition of a new cylinder, the topmast was raised again, the pin supporting it until this was brought about. The stays were attached at the required points as the erection of the mast progressed.

The stays, by means of which each mast is supported, are made of heavy plough steel cable, possessing great tensile strength. For each mast thousands of feet of this cable were used, great care being taken to see that the elastic extension of these stays was not so great as to result in the vibration of the mast during heavy winds. It was essential to break each stay into short lengths connected with great porcelain insulators in order that the electrical energy might not be absorbed, led to the earth by the stays and lost for purpose of wireless operation. For all connections at the masts, insulators and anchorages, special bridge sockets were designed. This did away with the necessity for splicing, and permitted a perfect and straight pull, thereby developing the strength of the cable. Heavy concrete blocks were used as anchorages for the stays.

It will doubtless surprise the average reader to be informed that miles of wire are necessary to send a wireless message. This fact was strikingly illustrated in the construction of the trans-Pacific stations. In addition to the antennae stretched between the masts, great quantities of wire were placed in the ground about the stations in order to provide an efficient earthing system or ground connection. Told in brief, a circle of zinc plates is buried in a trench, bolted together and joined to the wireless circuits of the power house by copper wire. Wires radiate from the zinc plates in the ground to a set of outer plates, from which extend another set of earth wires placed in trenches running the full length of the aerial.

Imperial Japanese Government wireless station, Funabashi, communicating with Marconi stations in Hawaiian Islands.

The capacity of each of the generators employed in the stations of the United States-Japan circuit, with the exception of that of Funabashi, is 300 kilowatts. These generators are driven by 500 horse power motors, except at Kahuku, where 500 horsepower turbines are used.

A feature of these stations that stands out distinctly is the type of aerials installed. Thousands of tons of steel are required in order, from the viewpoint of the casual visitor, to hang the thirty-two silicon bronze wires of the aerial a few hundred feet in the air. However, these antenna wires are the backbone of successful communication over long distance. The distinctive feature of the aerials at the Marconi trans-Pacific stations is that they are directional, that is the radiation of wireless signals in the desired direction is very much stronger than in any other. This control of the signals is a long step ahead in wireless communication. All of the stations are of the duplex type, and can receive and transmit signals at the same time.

The automatic sending and receiving apparatus plays an important part in wireless communication between the Occident and the Orient. The sending machine somewhat resembles a typewriter, and

The hotel built by the Marconi Wireless Telegraph Company to house its employees at the big receiving station at Marshall, California.

will make possible the transmission of more than 100 words a minute. Under the automatic system, ten or 100 messages can be filed at the same time at the office of the Marconi Company in Honolulu. They will be distributed among the necessary number of operators and the dots and dashes punched in a paper tape by a machine. This tape is fed into an automatic sender and the signals conveyed by land line to Kahuku, where the dots and dashes actuate a high power sending key, automatically energizing the aerial instantaneously with the feeding of the tape in the station, thirty miles or more away. At the transmitting station the dots and dashes operate magnets of the high-power sending key in the main energy circuits, and the signals are flashed to the points which the destination of the message calls for—either Marshall or Funabashi. If the message is destined for Marshall it will be received on a specially constructed dictaphone machine, each cylinder, as soon as it is filled with the dots and dashes, being handed to an operator, who will transcribe it into a typewritten message by means of a dictaphone machine running at normal speed.

Such were the difficulties, the achievements and a few of the problems met with. After the stations had been completed there was a long period of tests and trials. The first results of these were marked by the opening of the service between Hawaii and the United States on September 24, 1914. On February 2, 1915, the station in Ochiishi, Japan, it was announced by newspapers of that country, had received messages from the Kahuku station. Prior to picking up the signals of the Kahuku station, Ochiishi was receiving messages from a steamship 1,100 miles off the Japanese coast. The Ochiishi operators declared that the messages from Hawaii were clearer than those from the steamship, notwithstanding the fact that the distance was more than three times as great. This was only one indication of the great range of the Kahuku station, for while tests were being carried on with the station in Funabashi, near Tokio, Japan, which was selected as the Japanese unit to communicate with the Hawaiian stations, inquiries regarding the spark and wave-length of Kahuku were received from Porto Rico, the Falkland Islands, New Orleans, and New Zealand, where the signals transmitted by Kahuku were easily read.

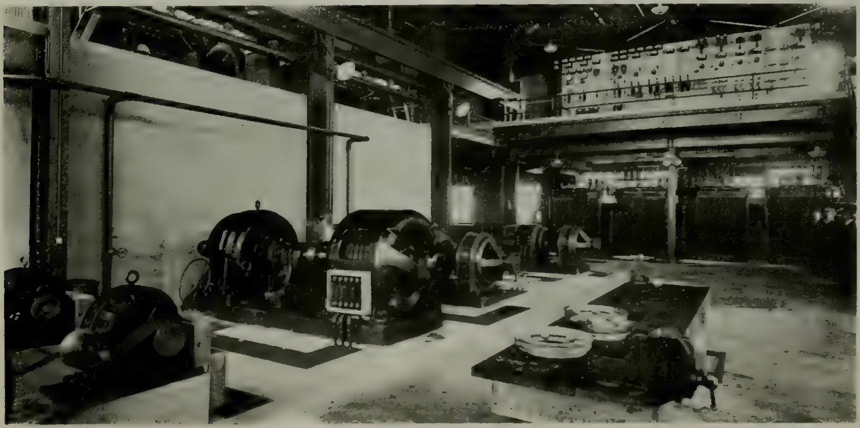
At 10 o'clock in the morning, New York time, and midnight, Tokio time, of the day appointed for the opening of the service, the cumulative result of the three years of study and effort which Edward J. Nally, vice-president and general manager of the American Marconi Company, and the members of his staff, had devoted to the task of establishing communication with Japan was signalized by an exchange of messages between notables in the United States and the former nation. As an illustration of the operation of the service it can be stated that a message from President Wilson to the Emperor of Japan, at Tokio, began its radio flight at the Bolinas station, from which, with the speed of a lightning flash, it took an unerring course across the Pacific and was received at the Kahuku station, spanning a distance of 2,087 miles. Quickly it was copied at Kahuku, given a new impetus, and sent speeding across the space of 4,140 miles that it had to traverse before reaching Tokio. In a similar manner the reply of the Emperor was dispatched to President Wilson. The message was transmitted from Funabashi and relayed at Kahuku to Marshall, which station has direct communication with the Western Union Telegraph Company, over whose wires traffic is forwarded. In Japan, connection is made with the Japanese Imperial Telegraph system to all points in the Orient.

All of the communications between the United States and the Hawaiian and Japanese stations are transmitted in English or Japanese. The Funabashi station is controlled by the Japanese Government and has two staffs of operators, military and civil, being employed by the Department of Posts and Telegraphs for commercial business, as well as by the Government.

For the present the Marconi United States-Japanese service is confined to San Francsico, Hawaii and Japan. There are two classes of service between San Francisco and Japan, a full rate or expedited service at eighty cents per word, a reduction of forty-one cents per word from the existing cable rates, and a deferred half-rate service at forty cents per word, the lowest cable rate at present being $1.21 per word.

This linking of two nations by wireless is simple in the telling and in time will doubtless be accepted as a part of the scheme of general conditions in communication. But the men who brought it about, who spent days and nights in determining the solutions of vexed questions, who conducted tests regardless of time and weather, who journeyed to distant parts of the world to blaze the initial path of the project—they will long remember the romance and the difficulties of the undertaking, even though it was all a part of the day's work.

Japan's latest steel foundry is to be named the Toyo Sietetsu Kaisha, or Oruental Steel Company. The capital of the new concern is $12,500,000, and the aim is at an annual production of 170,000 tons of pig iron and 150,000 tons of steel. The completion of the works will require three years. It will require the expenditure of $9,340,000 before the plant is on a productive basis.



Interior of the power house at the sending station Bolinas, California, showing 300 k. w. motor generator sets and control board.

THE SKANDIA'S NEW PLANT

The Skandia Pacific Oil Engine Company, which recently purchased the Gorham Gas Engine Works of Oakland, have been making important additions and improvements to their new shops. The two buildings formerly housing the Gorham plant have been merged into one structure by building over the intervening space. The main machine shop bay has also been extended out over the concern's waterfront, the travelling crane tracks permitting of finished engines being handled directly into the hull ready to receive them.

Among the improvements either completed or at present under way at the old Gorham plant are the following: A draughting room is being fitted up; a complete brass foundry is being installed, it being the intention of the Skandia Pacific Oil Engine Company to make all its own brass castings; the old tool room is being enlarged and its location moved to the new building between the two old shops, where it will serve either bay of the machine shop equally well; a well equipped, roomy pattern shop has been fitted up with modern and efficient wood working tools and here all patterns are made in duplicate. Along the waterfront a heavy concrete retaining wall has been built and the extended end of the machine shop which joins this wall has been fitted up as a test stand. Solid concrete foundations have been laid with fly wheel wells, drains, oil sumps, etc. The floor has been laid out with a view of the possibility of testing six 240 horsepower Skandia engines at the same time. The arrangement is thoroughly elastic, however, and practically any size of engine can be bolted down for test purposes.

The new Skandia shops are exceedingly busy in every department. With a very large number of 240 horsepower engines on order, all parts are being finished in batches of two dozen. The first engine to be erected at the new plant will be the main drives for the first of the McEachern built ships at Astoria. These engines will receive shop tests in a day or two.

The Gorham works had always taken a great interest in heat treatment of steels and had assembled a complete set of standard instruments and heat treating furnaces. This important feature will be fully followed up by the Skandia people who are making every effort to secure for themselves as fine a plant for the turning out of internal combustion engines as it is possible for skill and money to produce.

MOTORSHIP RELIABILITY

The 7,200-ton motorship "Sebastian" arrived in New York on her fourth visit on December 27, having had an exceptionally stormy passage from Rouen, France. On this trip one of her two 1,100 i. h. p. Werkspoor Diesel engines made a non-stop run, and the other was stopped for one hour while a very minor adjustment was being made. Chief Engineer Cole of the "Sebastian" states that the longest stop of either engine since this vessel was placed in commission last June has been six hours, this stop being due to a sea water connection breaking and the water getting into the lubricating oil. The engine had to be stopped while the watery oil was drained out and the leak repaired. Chief Engineer Cole further states that the engines are perfectly reliable, and that he would not hesitate to go to sea with only one engine. The two main oil engines together averaged a fuel consumption of five and six-tenths tons of residual oil fuel per 24 hours, while the donkey boilers used 1.9 tons per day.

DEMONSTRATION ENGINE TO ARRIVE

The 150 horsepower Southwark-Harris Diesel motor built by the Southwark factory for the Standard Gas Engine Company, Pacific Coast distributors and manufacturers of the Southwark-Harris, for demonstrating purposes, was shipped from the Philadelphia factory January 22nd. As soon as it arrives in Oakland it will be set up at the company's plant, and used for demonstrating purposes.

C. C. Kriemler, secretary for the Standard Gas Engine Co., last week made a trip to Seattle to arrange for the largest Diesel installation yet made on the Pacific Coast— that of the two 625 horsepower Diesel engines for the new motor ship being constructed by the Alaska-Pacific Navigation Co.

These engines are four cylinder motors, directly reversible, and operate on the two-stroke cycle principle, as do all Southwark-Harris engines. The scavenging is done by a step-piston, which is used as the starting piston—the step-piston becoming an air motor by the admission of air under low pressure for starting.

It is not necessary to bring the motor to speed on the air, for it will "take hold" on the first half revolution, but the air can be continued in force by means of an auxiliary lever, thus increasing the power of the motor at low speeds, and making it possible to start under load, an exclusive Southwark-Harris feature which gives it all the advantages of the steam power plant, together with the superior fuel economy and the absence of stand-by losses which are the best features of the Diesel installation.

The use of the scavenging piston for starting purposes has the advantage of bringing the motor from stone-cold to full power in ten seconds, and makes it possible to reverse from full-ahead to full-astern in five seconds. In addition, it has the further advantage of never admitting cold air into the combustion chamber, even the scavenging air being heated before entering the working cylinder. This does away entirely with the most prolific source of cracked pistons and cylinder heads.

A big gasoline motor for heavy work was shipped January 17th by the Standard factory. It was a 175 horsepower motor for the Pacific-American Fisheries, and went North on the steamer "Norwood."

The salmon fleet equipment this season will have an even larger percentage of Standards than formerly. The Standard factory has been at work day and night for three months in an effort to fill orders on hand for spring delivery, and this condition will continue for, at least, three months more. The forty and fifty horsepower motors have proved extremely popular with the salmon fishermen this season—due to their excellent record in the purse-seining and other fishing operations of Alaska, Puget Sound, the Columbia River and Southern California.

THE "BRAMEL POINT"

The finishing of trials and the first round trip voyages from New York to Lisbon, mark the successful completion of a rather unusual type of oil tanker, the first full powered, steel motor vessel built in this country, the "Bramel Point."

This tanker, which was fully described in the March, 1916, issue of the Pacific Marine Review, is 306 feet long, 47 feet beam, 28 feet moulded depth, 22 feet 8 inches load draft, 7225 tons displacement and of 5,500 tons dw. capacity. She is powered with three 550 b. h. p. Bolinder engines, being triple screw.

The first trial trip was held on Chesepeake Bay on October 29, the ship drawing 13 feet 6 inches forward and 18 feet aft, with the following speeds for ship and the three engines, recorded on the measured mile running alternately with and against the tide:

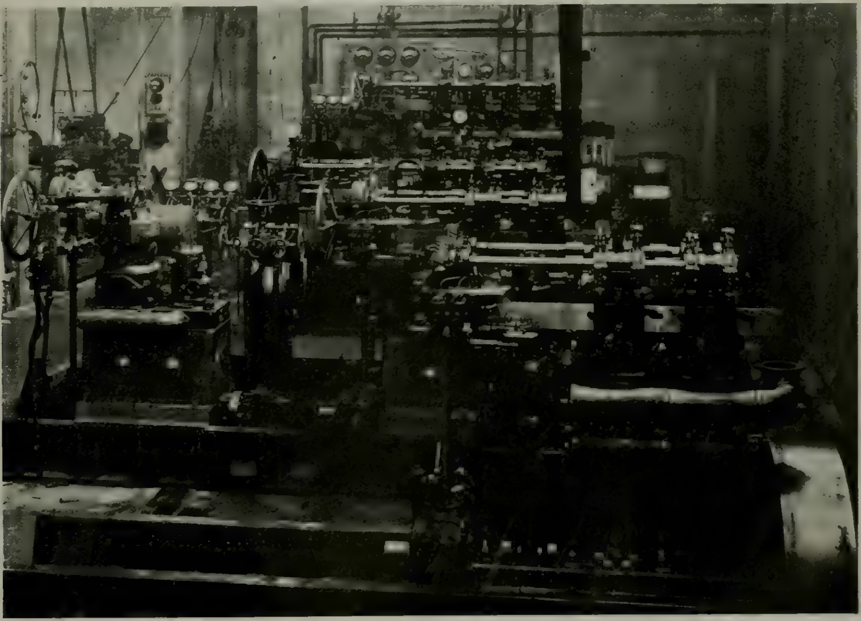
	port r. p. m.	center r. p. m.	stbd. r. p. m.	ship knots
With tide	154	136	144	9.783
Against tide	152	138	142	9.351
With tide	151	137	147	10.465
Against tide	154	142	151	9.574
With tide	154	142	151	10.277
Against tide	147	000	144	9,091

The mean for the best two runs with and against the tide was 10.019 knots.

The fuel oil used was Pennsylvania crude of about 19,000 b. t. u., 30 degrees Baume and with a specific gravity of 0.88.

The following day, load trials were held with the ship drawing 21 feet forward and 23 feet aft. Four runs were made over the measured mile with the following results:

	port r. p. m.	center r. p. m.	stbd. r. p. m.	knots speed
Against wind and tide	146	144	141	8,276
With wind and tide	147	145	143	10.198



A group of "Kind" engines on the testing stand in the shops at Turin, Italy. These fine Diesels have found a wide use both for mercantile and naval uses.

Against wind and tide	143	idle	136	7.317
With wind and tide	135	idle	133	8.612

On these two trials it was found impossible to bring the engines up to their designed speed of 160 revolutions, so the pitch of the propellers was materially reduced after which a third trial trip was held on November 5th, the ship being loaded to a mean draft of 22 feet 11½ inches. Four measured mile runs were made as follows:

	port r. p. m.	center r. p. m.	stbd. r. p. m.	knots speed
First run	156	151	152	9.878
Second run	159	152	156	9.84
Third run	153	151	151	8.18
Fourth run	149	148	148	8.07

The propellers in use on the Bramel Point are three bladed, the port and starboard wheels being 8 feet 6½ inches diameter with 7 feet 8¼ inch pitch, the pitch being adjustable from 6 feet 11¼ inches to 8 feet 5½ inches. The projected area is 24.51 square feet and the developed area 27.895 square feet. On the final trial the pitch of these propellers was decreased to 7 feet 3 inches. The center propeller is 8 feet 6½ inches diameter with 7 feet 3 inches pitch, the pitch being adjustable from 6.63 feet to 8.04 feet. The projected area is 24.51 square feet and the developed area 26.645 square feet. On the final trial trip the pitch was reduced to 6 feet 6.3 inches.

Each engine weighs 40 tons and has an overall length of 27 feet, a width of 6 feet and a height of about 10 feet. The engine room is 44 feet long by the width of the ship. The "Bramel Point" made the run from Baltimore to New York in 46 hours, the average speed of the engines being 155 revolutions and of the ship 10.4 knots.

NAVAL ARCHITECTURE CLASSES

The Oakland Board of Education has made arrangements for evening Naval Architecture Classes to be held in the vocational high school building of that city. C. J. Daly, of the Moore and Scott draughting room force, has been secured as an instructor, and both the Moore and Scott Iron Works and the management of the Alameda branch of the Union Iron Works are giving the new venture in education their hearty support.

ENGINES FOR SCHOONERS

The schooners "Mayflower" and "Albion," both old timers on this coast, which were recently purchased by the Simmons Hardware Company of St. Louis, are to be equipped with engines and then placed in the kelp service in connection with the kelp harvesters and potash plant of the company in Southern California.

Both schooners are now at Munder's Yard, San Francisco, being overhauled. They will then be removed to the Union Gas Engine Company yard in Oakland and each will be fitted with twin 60 horsepower, three-cylinder engines. The Mayflower is of about 85 and the Albion of about 75 tons register.

CRAIG DIESELS ORDERED

The International Railways Company of Central America has recently come into the market for wooden vessels equipped with internal combustion engines. One of these is now being built in Portland and will be equipped with a 200 h. p. Craig Diesel engine.

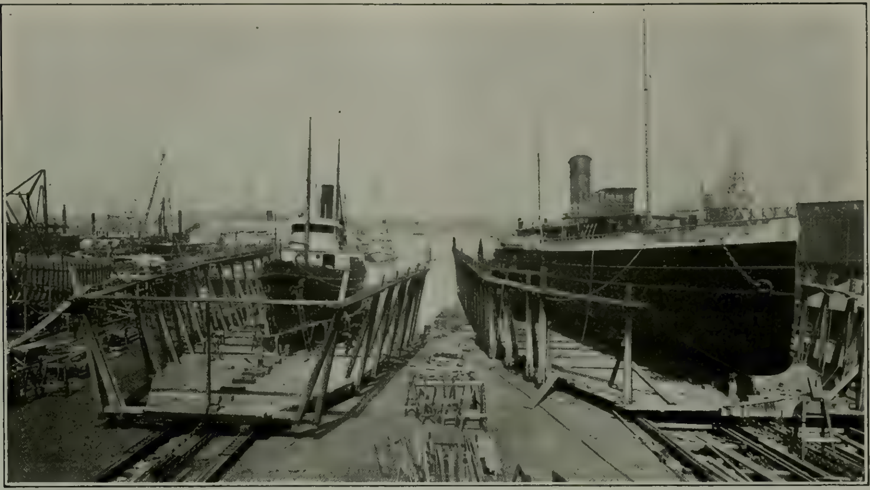
Craig Diesels will also be installed in three wooden vessels building for the Manganese Mining Company of New York on this coast. One vessel will have two 300 horsepower engines and the other two will have twin 200 horsepower Diesels. The Craig engines are being handled on this coast by the Union Gas Engine Company.

GAS ENGINE ORDERS BRISK

The Union Gas Engine Company reports the sale of two 50 horsepower marine engines to run on alcohol. These engines were ordered through the Philippine agents of the gas engine company. In addition to this very unusual order, the Federal Fisheries Company has ordered a 60 horsepower Union engine for a fishing boat being built by Beviacqua Brothers of North Beach. New Zealand parties have called for a pair of 85 horsepower Union engines and a 9 horsepower Union "gas" driven windlass. A 200 horsepower, four-cylinder Union Gas Engine is now on the test stand and will be ready for installation in the schooner "Angel" belonging to the Merchants Navigation Company of Los Angeles.

NEW HONGKONG WHARFS

The Hongkong and Kowloon Wharf and Godown Company have extended their wharf service by opening a new wharf 666 feet long by 45 feet wide. Most of the freight into and out of Hongkong is handled by lighters. There is a depth of 30 feet alongside the wharf at lowest spring tides. Two new warehouses have also been erected, one of reinforced concrete structure providing for 20,000 tons storage and the other a brick building of 4,000 tons storage capacity.

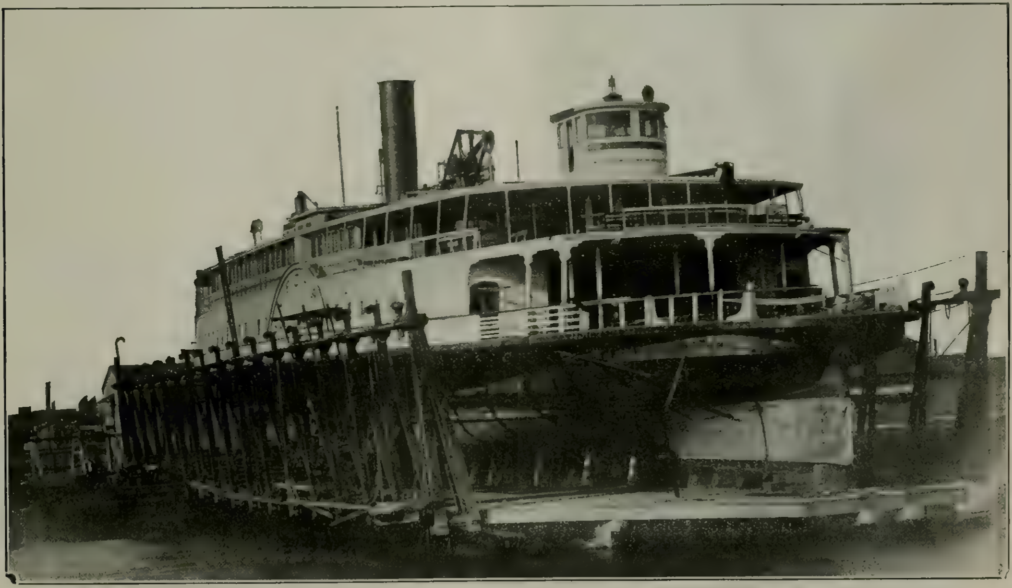


A shipyard layout showing two Crandall marine railways in operation.

Pacific Coast Marine Railways

There are large shipyards in the United States which have never operated a dry dock in connection with their plants, but such yards do not figure largely in the repair business. Up to the present unprecedented boom in shipbuilding, the shipyards on the Pacific Coast were alternately busy and slack and were carried through the dull periods by repair work and as even the periodic overhauls which vessels are subject to make docking facilities imperative, many of the yards up and down the Coast are fitted with dry dock facilities of one kind or another.

The graving dock, the floating dock and the so-called railway docks each has its own particular advantages and the installation of one type or the other depends largely on local conditions. The



A 2500-ton Crandall dry dock with the ferryboat "Sausalito." These docks are well represented all along the West Coast.

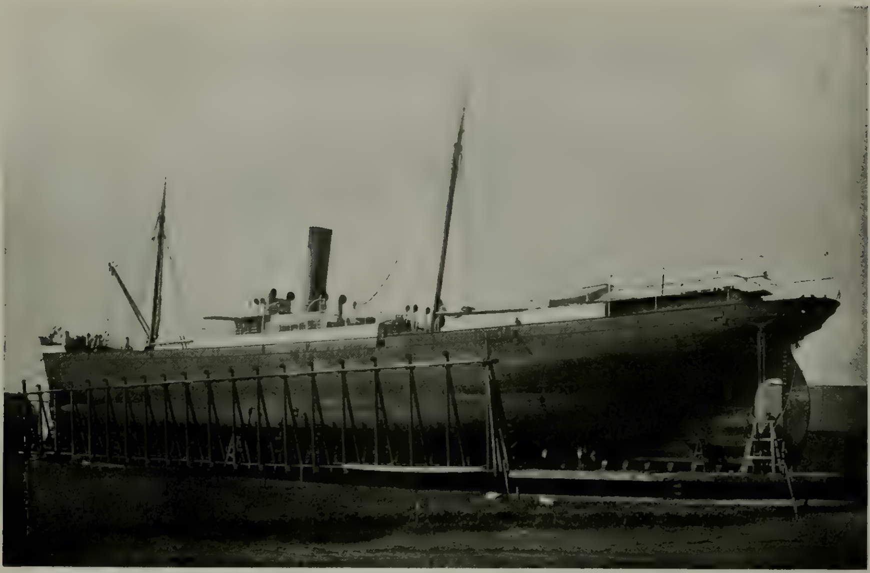
question of first cost and of the adaptability of the different types of docks to the condition of the available foundations constitute problems that hardly admit of general discussion since each particular case is hedged about with so many local limitations, however the floating dock has a certain advantage over the graving, generally speaking, in that it brings the vessel nearly up to the general yard level and the ends, being open, allows of a freer circulation of air thus drying off a ship's bottom more rapidly for painting. The marine railway dock possesses this advantage to a still more marked degree and also brings the vessel to be repaired practically into the shipyard itself and allows of more working space around the hull. This fact coupled with the conditions of bottoms, operating costs, etc., has led many of the Pacific Coast shipbuilding yards to install marine railway and quite a large number of these docks are of the well known Crandall type, as built by the Crandall Engineering Company.

The "Crown of Germany" on a 3,000-ton Crandall dock at Victoria, B. C. This dock is of composite construction.

The Crandall dock at the Winslow Marine Railway and Shipbuliding Company's plant, Winslow, Washington. The schooner on the dock is the "James Tuft."

The Crandall Railway Dry Docks have found favor pretty generally throughout the maritime world, as is evidenced by the fact that while they are scattered pretty liberally around the United States and Canada, they are also found in Norway, Denmark, Greece, the Philippines, Hawaiian Islands, Mexico, South America, Cuba and West Indies. However, it is with the use of these docks on the Pacific Coast that we are most familiar. The largest example of this type of dry dock is

The 5,000-ton Crandall marine railway at the Southern Pacific Shipyards, East Oakland, California. The "Contra Costa," the largest car ferry in the world and the largest wooden craft ever built, is shown on the dock.



The 3,500-ton Crandall dock at the Alameda plant of the Union Iron Works Company.

that in use at the Southern Pacific Railroad's shipyard in East Oakland, its capacity being 5000 tons. At the Alameda branch of the Union Iron Works Company there are two docks of 3500 and 1800 tons capacity. At the Moore and Scott yard on the Oakland Estuary there is a 3000 ton railway in operation, the Winslow Marine Railway and Shipbuilding Company, of Winslow, Washington, also has a 3000 ton dock in use; at Vancouver, B. C., there are three Crandall docks in operation, and at Victoria two, the larger being of 3000 tons capacity.

Generally speaking, the Crandall construction lends itself readily to the use of wood, steel or reinforced concrete as a building material. Of course, the all-wood construction lends itself readily to the Pacific Coast on account of the supply of big timber; and, if properly protected against the teredo, the all-wood construction has many advantages.

Unlike a graving dock, a marine railway does not require any power once a vessel has been hauled out on it. The graving dock must be kept clear of leakage, seepage and surface drainage, and for this purpose a small pump must be kept in operation practically continuously. The time required for docking a vessel can also be lessened by the use of a marine railway, the ship is dryer sooner, and a greater percentage of the working day is saved for repair work, cleaning or painting.

In all types of dock, absolute rigidity of foundation is a feature to be insisted upon, and this essential to a good dock is largely a geological one, and is as easily met in one type as another.

The illustrations herewith show several of the Crandall docks in use on the Pacific Coast, where the modern-sized dock of this character is very much in evidence.

ASTORIA TO BUILD DREDGE

The Port of Astoria Commission is to call for bids for the construction of a new dredger. The new craft will be used to improve the Skipanon river and other waterways within the jurisdiction of the port.

The turret steamer "Bencliff" in the dock of the Kensington Shipyard Company.

Coastwise Navigation on the Pacific

By R. S. PATTON, Chief, Coast Pilot Section, U. S. Coast & Geodetic Survey

THE problem of coastwise navigation along the California, Oregon and Washington coast is one of exceptional difficulty. Without considering the stress of storms, which are more or less common to all waters, we have here the additional condition of long distances between landfalls, combined with prolonged periods of fogs, and with currents whose strength and direction can never be accurately estimated, all combining to tax the skill and vigilance of the navigator to the utmost.

Everyone who has followed the maritime history of the coast is familiar with the long list of casualties which have occurred in past years. From the loss of the Valencia, in 1906, with the sacrifice of 134 lives and $175,000 in property, to that of the Bear last June, the toll has been a heavy one. These disasters have been due to a variety of causes—to collisions, to strandings when attempting to enter the various bar harbors of the coast, or to gales, but a large percentage of them have occurred in comparatively smooth, but foggy weather, due to the action of forces which have caused deviation from the track, or rather, to speak more accurately, to the failure on the part of the men entrusted with the safety of the vessel to take proper precautions to guard against the action of those forces.

I have before me as I write, a list of 54 vessels which, since 1900, have stranded on this coast in thick weather, with damage ranging from a few hundred dollars in repairs to the total loss of the vessel and all on board. And it may confidently be asserted that the great majority of these accidents might have been prevented if the men entrusted with the navigation of the vessels had taken every precaution possible, or had appreciated the vital significance of conditions and events which, had they been observed and rightly interpreted, would have given warning of impending danger in ample time to have prevented disaster.

This may seem like a pretty strong statement to make, and at first thought the majoriy of its readers will probably be inclined to question its justice. Yet it is true—more than that, it is the kind of truth which is based, not on theory, but on an actual detailed knowledge of the circumstances of each specific case.

Or, if further proof is needed, let the reader recall the findings of the board which is charged by the Government with the duty of investigating and passing judgment on these accidents—the Steamboat Inspection Service. He will find that in all save a relatively small number of exceptional cases, some one has been found guilty of negligence or unskillfulness, and his license has been suspended for a longer or shorter period, depending on the gravity of his offense. This, after all, is the final proof, not based on any personal opinion, which is always open to dispute, but in a form which has a direct and vital bearing on the very livelihood of those concerned, and which, therefore, cannot be ignored.

No one, I think, will question the findings of that Board. If there is anywhere in the land that a man is tried before a jury of his peers, it is here. Two practical, experienced seafaring men, with years of experience similar to those of the man before them, attempt to bring out all the facts in connection with any specific case, and then pass judgment on these facts, unclouded by any of the fine-drawn legal technicalities which too often, in some other courts, completely obscure the real issues.

Granted, then, that a large percentage of these disasters might have been avoided, it becomes both interesting and instructive to enquire into the conditions under which they occurred, and the methods and precautions suited to safe navigation under those conditions. Not with a view to resurrecting things which are past and done with, but merely that the casulaties of the past may at least serve some useful purpose by becoming warnings for the future.

The conditions with which we are concerned here are, of course, fogs and currents.

Of the former, little need be said. The weather either is foggy or it is not. If it is clear, one set of methods for safe navigation is used; if foggy, an entirely different set must be resorted to. The significant thing about fogs, however, is that they so often creep in almost imperceptibly until they surround one. The safe precaution, therefore, is to anticipate them; not to be content with locating the vessel's position at or near the various turning points or dangers, but to take advantage of every opportunity to obtain a fix, thus keeping a careful and constant check on the course made good, so that when the fog does come the present position will be known and the probable set may be anticipated with some degree of certainty.

The subject of currents must be dismissed with almost equal brevity, not because it is equally simple and easily stated, but because it is just the reverse. Its very magnitude and complexity make it impossible of adequate discussion within the limits of this article. Moreover, our present knowledge of the currents is so imperfect and fragmentary that no definite predictions of their action can be made. We believe that they are surface

The Revenue Cutter "Bear." This class of vessel performs a splendid service throughout waters adjacent to American territory.

currents merely, caused by the prevailing winds, and thus are subject to frequent change in both direction and velocity. But, on the other hand, there is good reason to believe that they are also influenced to a marked degree by the meteorological conditions far from shore, and that these two forces, working simultaneously, may either counteract or augment each other. Certainly the results are sometimes phenomenal. The writer has heard it asserted by a man of years of experience on this coast, a licensed master of both sail and steam, that at the time the Valencia was wrecked, and for some days before and after that catastrophe, there was, to his personal knowledge, a current setting northward along the Washington coast at a velocity of at least five knots. Such extreme cases are, of course, rare; the maximum velocity usually attributed to the current being about three knots, but the only safe presumption is that they may occur.

One tendency, that of the currents to follow the curve of the shore, seems to be well established, and so a vessel steering one course from point to point will feel its effect first on one side and then on the other. For instance, if, southbound, you pass Blanco the proper distance off, Macks Arch, a little outside, N. W. Seal Rocks a little more outside, and find your speed made good retarded somewhat, you will almost certainly be set in toward Mendocino. On the other hand, if you have set in toward Seal Rocks and your speed has been accelerated, you will probably be set off on nearing Mendocino.

It is also well to remember that the current is commonly blamed for results for which it is in no way responsible. Uncertainties in the compass deviation, bad steering, list, and leeway from wind and sea all cause deviation from the track and should be carefully guarded against.

So for our purpose here, we may summarize our knowledge of currents by affirming that excessive velocities do at times exist, but that just what causes them, or when they may be anticipated at their maximum, we cannot tell. We know the tendencies, but that knowledge alone will not save our ships when the exception occurs. So here the rule, and the only safe rule, is—Assume, from the last departure, a maximum set acting in the direction of the danger and take your precautions accordingly.

There is no secret about these precautions, which should be taken to insure safety. They are the very fundamentals of seamanship. There is not a man who has taken out his master's papers who does not know them all. The trouble is that some of them do not use their knowledge. They take things too much for granted. They assume, for instance, that they are making a course good today because they made it good last voyage, even though they know how uncertain the currents are. They know it, but they do not stop to realize how that known uncertainty may be affecting them at that very moment. "Why didn't you take this or that precaution?" has been asked more than one poor fellow up to answer for the loss of his vessel, and his only answer has been, "I don't know, Captain; I thought I was all right; I was sure I was all right."

There, in brief, is the whole trouble; not lack of knowledge of the precautions to take, but the failure to use precautions which are well known to all. So there is no thought, in what follows, of trying to teach anything new. But there is the earnest hope that by once more emphasizing familiar facts, some who are now delinquent may be aroused to the importance of measures which they now neglect. In fact, the writer would feel like apologizing for discussing, at all, details which are so essentially the fundamentals of seamanship, could he not preface that discussion by the statement that it has been the neglect of these very fundamentals which has been responsible for most of the casualties of the past.

The first precaution, Captain, is KNOW YOUR COMPASS. See that you have a complete deviation card, and a correct one. Keep it posted where it can be used, and keep checking it from time to time by azimuths taken on your various courses. It has been a cause of the greatest surprise to learn how common a practice it is to shape the various courses from the log of the previous voyage. In not merely one, but a considerable number of the cases already referred to, it was impossible to tell whether the disaster was due to an inshore set on that particular voyage, or an off-shore set on the previous one. It might equally well have been either. Nobody could tell what the magnetic course was that they had been steering. Suppose, just for example, that vessel had been southbound in thick weather, steering a course which, on the voyage before, had taken them a mile outside Blunts Reef lightvessel. But the voyage before they had northerly winds and a southerly, and, as they neared the point, an offshore set. The course they were steering was just enough in error to correct for that set, and they passed the point the proper distance off. All well and good. But next voyage there was a northerly set—or perhaps no current at all. They steered the same course—and fetched up on the reef. Mind, I do not say that is how any particular accident actually happened, but I do say that is how a number of them may have happened, for all anyone could tell to the contrary.

Or suppose that, as may happen at any time, you have occasion to shape a course entirely different from any you have been steering recently. How are you going to do it unless you know your deviation?

Or again, suppose you are coming down the coast with a low-hanging fog inside of you. The shores are hidden, but you can see the mountain tops, and you want to locate your position by cross bearings. What good are any bearings you may take, unless you know your deviation?

Captain, the course steered on the previous voyage is a mighty good thing to know and to use, but only when used in connection with four other things: the deviation, the weather conditions, your distances off your landfalls, and the differences between your logged distances and the corresponding distances over the ground. Combine those five things, and you get a pretty good idea of the total of the forces which tend to set you off your course, together with the conditions under which, in future, you may expect to find them operating again. Then all you have to do is to divide that total up, assigning the proper share to each of the causes which contributed to it; current, wind and sea, bad steering, and the list of your vessel. The moral of which is, of course, that it is valuable only as giving you a general idea of what to expect, but that in thick weather you dare not rely on your compass alone, so you come naturally to the second precaution.

USE YOUR LEAD. That is the one sure and safe guide which may be relied upon in thick weather. There are certain critical depths which, if followed, will carry you safely around each turning point, or within sound of each fog signal. But, remembering the rule in regard to currents, sound early and often, and after you think you are safely squared away on your new course, sound awhile longer, just to be on the safe side. That is the method used by the men who have been navigating this coast in safety for years; its neglect has contributed directly to nine-tenths of the accidents of the class we are considering.

The need of the care to be exercised in sounding cannot be over-estimated. If it does not receive the personal attention of the master, the man to whom he delegates the duty should be so carefully trained, and so impressed with the importance of his task, that a mistake is next to impossible. Make him realize that at such times the safety of the ship is entirely in his hands.

And when you are sounding, don't try to be sparing in your use of tubes. There is a method in common use, of simply letting the lead go, and estimating the depth by the amount of wire out. It is done to save tubes! But, Captain, that method is not good enough. Don't use it. It is well known that the loss of the Bear last summer was largely due to the fact that soundings were taken in that way, for had tubes been used they would at once have revealed the mistake that was being made by the officer in charge of the sounding machine. And a small part of the money loss involved in that disaster (to say nothing of its cost in human life) would have been sufficient to supply every vessel on the coast with tubes enough to outlast the ships themselves. Just remember that if you use that method, you and your ship may be the next to pay the penalty.

The reasons why this method is unsatisfactory are so obvious that they seem scarcely worthy of mention. There are too many factors entering into it, and every one of them variable and uncertain; the speed of the ship, the condition of the sounding machine (that is, the smoothness and ease with which the reel is running), and, above all, the "personal equation" of the operator. And finally, since your soundings are your only guide, you want the very best and most reliable that can be gotten. That alone should be answer enough. So, for every sounding, a tube should be used, and the lead should be armed to bring up a sample of the bottom. The amount of wire out should, of course, be noted and reported immediately, for that does furnish a rough idea of the depth some moments before the tube can be reeled in, but the actual depth should always be taken from the latter.

As a single specific instance of how this method may be used in rounding the various headlands, let us refer once more to Mendocino. Here is the statement of a man who for ten years has been serving as commander of one of the larger vessels plying between Puget Sound and San Francisco: "If at all uncertain, I alter my course and feel my way in with the lead to pick up the 30 fathom curve about opposite Table Bluff, and then haul out on a South, magnetic, course, keeping in not less than thirty fathoms, until I pick up the lightvessel, which I thus always make and pass as readily as in clear weather."

This method of navigation renders imperative a careful and constant study of the chart. The navigator must learn what, for any given locality, are the critical characteristic features revealed by his lead, which insure his safety, or give warning of the proximity to danger. What depths to follow, and what to avoid; where soundings may be taken to advantage to obtain a check on one's position; information revealed by the character of the bottom; and, perhaps most important of all, as being the condition most likely to cause trouble even for the careful navigator, certain areas which duplicate the critical depths of the track, so that if the former were mistaken for the latter, the results might be most serious. Here is a case of the latter sort, of particular interest because it is uncharted, and because its location, and even its existence, are by no means definitely established.

Just south of Mendocino is a submarine valley which heads near the 30 fathom curve. Vessels which, south bound in thick weather, fail to hear Blunts Reef fog signal, continue their course, in depths of over 30 fathoms, until the lead drops into deep water, when they assume that they are past the point, and haul in for Arena. But there are masters who assert that there is a similar submarine valley north of the cape, which also heads somewhere near the 30 fathom curve, from three to five miles north of Blunts Reef. The number of these men is few compared with that of those who state that they have sounded their way past the cape time after time without getting any indication of such depths. But since the evidence of one man, who declares that a thing exists because he has seen it, is worth that of a dozen who doubt its existence because they have not seen it, and since the navigator should always err on the side of safety, it is decidedly the wise course to assume that in this case such depths do exist, and not to change course on the first cast which gives deep water, but rather to hold the course and sound a while longer to see whether bottom will be picked up again. Probably the truth of the matter is that there is a deep hole of small extent, which a few men have happened to find, while the majority have missed it entirely.

At this point it is eminently proper to admit certain evidence for the defense. Thus far such criticisms as have been made have all been directed at the navigator. Now, however, let us admit that, owing to the lack of funds and vessel equipment for surveying the Pacific Coast, the charts themselves are far from adequate for the needs of the mariner. In many important localities there are no soundings given; in others they are so widely spaced as to be of little or no value to the man endeavoring to fix his position by means of his lead. The currents have never been made the subject of the prolonged and systematic observation which is necessary before their probable action can be predicted.

It is, therefore, particularly gratifying at this time to be able to state that increased appropria-

The U. S. Cruiser "Milwaukee" on the beach near Eureka, the result of sending the big craft on a stupid errand.

tions made at the last session of Congress will enable the Coast and Geodetic Survey to asselerate both a resurvey of the coast and a systematic study of the currents.

There are two distinct types of vessel on this coast, which follow totally different tracks. The steam schooners, with their low power, as a rule keep close inshore, in order to escape the full effect of wind and sea, while the full powered steamers keep well offshore, approaching it only at a few points. Thus the conditions which they encounter differ materially. The former are always in closer proximity to danger, and, moreover, because of their slower speed, will always for a given distance experience a greater effect from current, wind and sea, and consequently a greater tendency to be set off the course. But, on the other hand, their courses are correspondingly shorter, and they are always, except in a few exceptional and restricted localities, within soundings, so that they have the decided advantage of being able at all times to use the lead, and thus keep a constant check on their position. The steamer, on the other hand, is beyond soundings for long distances, entering them, as a rule, only at either end of each course, and thus, though they are beyond the zone of danger for the greater part of the time, as they approach their landfall they are subject to much greater uncertainty than is the vessel which has been continuously following the charted depths. So, it would be difficult to say which has the harder task, but be that as it may, the principles above enumerated apply equally to both; the differences are merely in the details of their application.

Finally, let us remember that the proverb "eternal vigilance is the price of safety" probably applies more fully to the profession of seamanship than to any other calling. The master in particular, since he is always and under all conditions responsible for the safety of his ship, should be constantly on the alert to prevent lapses or mistakes of every sort. He should shape and alter all courses himself; should ever carry his reckoning ahead of his actual position, anticipating and guarding against every possibility of being set into danger; should check his distances off important landfalls or in the approach to areas which should be avoided, where an undetected error in a single log reading might mean disaster; and most of his time, particularly at night, should be spent on the bridge, in immediate touch with his surroundings. His watch officers will invariably take their cue from him. If he is negligent, easy-going, and inclined to take things for granted, they will become the same, and soon that atmosphere of slackness and negligence will pervade the entire ship. So he should never fail to set the example of constant vigilance and alertness, and should ever demand from them a strict emulation of the same qualities. Sooner or later such vigilance will be rewarded, for when, under some extraordinary conditions he has been set into danger in spite of all his precautions, there still remain many agencies which may give warning of proximity to the land; agencies which constant vigilance may detect, yet which the careless would never notice. The presence of kelp; the change in the direction or character of the swell, flattening out under the lee of the headlands or piling up into the unmistakeable ground swell on the weather side; the swirling of the current over irregular shallow bottom; the change in color of the water, or the hauling of the wind along the shores; driftwood, the smell of smoke from the sawmills or the glare from the slab-fires; the cries of sea-birds on the rocks, or the sound of the surf; each of these is a danger signal to the true seaman.

Eternal vigilance: there is the final precaution and the last word in seamanship. A vigilance which takes account of every condition and event; which becomes an instinct for detecting danger in ways which its owner himself cannot explain; which takes every possible precaution, never content with just one, because that one, no matter how apparently trustworthy, may suddenly fail him as it has others; as it failed the master who, ignorant of the recent change in the character of a fog-signal, ran his vessel ashore through mistaking it for the horn of a sailing vessel and attempting to avoid it.

There are disasters occurring, in spite of every possible precaution, from causes so unusual that it is humanly impossible to anticipate them, and therefore as long as there are ships there will be shipwrecks. But in such cases there are two very important things which are not lost: one's own self-respect, and his standing with those in his own profession who are competent to judge him. Make it your business, Captain, to see that your accident, if it ever occurs, shall be of that sort.

HANDSOME STEAM YACHT

The Pusey and Jones Company of Wilmington, Deleware, are just putting the finishing touches on the steam yacht Nokomis, building to the order of H. E. Dodge of Detroit. The vessel is 243 feet in length by 32 feet beam and is a very handsome flush decked craft. She is driven by twin sets of triple expansion engines, steam being supplied by B & W boilers. The main feature of the equipment of the Nokomis is the seven motor boats carried, one of these being a 35-foot express launch with a speed of 40 miles an hour.

Tonnage Shortage Reviewed

MR. J. FRED LARSON of the Heath Shipbuilding Company recently embodied his views on the shortage of ships, the future outlook of shipbuilding and the prospects for the Pacific Coast in the following analysis:

"The world's merchant marine before the war consisted of 50,000,000 tons; every ship was in profitable use and the world's tonnage had been increasing at the rate of 2,000,000 tons a year to take care of the increased demand of commerce.

"Since August, 1914, the commencement of the war, more than 5,000,000 tons have been destroyed, 4,400,000 tons interned and 12,000,000 tons commandeered, leaving only 28,400,000 tons, or 57 per cent, in use, and vessels are being driven so hard that authorities in the shipping world say that most of them will be scrap in two years. They also show that we must have 60,000,000 tons in the water by 1919 to move the world's commerce. Nearly 35,000,000 tons must be built new. Where is it coming from?

"The present capacity of the world is less than 3,000,000 tons a year, in 1284 shipyards, and two-thirds of these yards have contracts running now from 1919 to 1923. The others have all they can do for 1917 and 1918. The increased capacity of a number of these yards are limited by supply of engines and steel plate. The demand for engines is rapidly increasing and contracts are now being made for delivery from eight to 12 months hence. Steel mills of this country are more than 11,000,000 tons behind in orders for steel, which has raised in price from 1¼ to 6 cents a pound.

"Somebody has got to get busy to replace the ships that are being destroyed—nearly 1000 in the past nine months, with a terrible increase each month as follows: April, 90 vessels; May, 63; June, 64; July, 147; August, 102; September, 114; October, 139; November, 147, and December, 134.

"In November and December England lost 112 ships of 306,609 tons, Norway 77 ships of 94,751 tons, Denmark 25 ships of 22,692 tons, and Sweden about the same.

"England has lost during the war 1100 merchant ships of 2,500,000 tons; England's allies 292 ships of 532,448 tons. Total allies' loss, 1392 ships of 3,032,448 tons.

"Germany and the central powers lost 88 vessels of 211,920 tons.

"Norway, Sweden and Denmark 473 ships of 528,301 tons. Norway alone lost 308 ships of 368,546 tons.

"The United States lost 10 ships of 24,558 tons.

"Total ships lost during war, 2156.

"When peace is declared there will be a scramble for drydocks and shipyards to put in condition the 4,400,000 tons now interned. There are only 811 drydocks in the entire world, so at that rate it will take more than a year to put these interned ships in shape, and for every month of continuation of war we lose 350,000 tons; so we come back to the same point, more than 30,000,000 tons must be built and the best we can hope to do from every calculation is 4,000,000 tons a year. The present capacity is 2,400,000 tons yearly in the entire world. It looks like from seven to ten years will be required for merchant vessels alone, aside from the immense appropriation made by all nations for increases in navies. The United States alone proposes to spend $185,560,000 for 66 naval vessels. These must also be built in American yards.

"There are 417 ships now building in the United States and shipbuilders hope to launch 314 vessels in 1917 of 960,899 tons capacity, and 105 ships in 1918 of 519,047 tons. That is 1,479,946 tons in the next two years. Foreign yards are full up for the next five years, so our chances for future contracts are the best.

"The opportunity of Oregon and the Pacific Coast is here now, and we have before us in Oregon a prosperous period of many years in which we must improve our facilities and methods so much that there will be no question of our shipyard efficiency and ability to meet competition.

"Steel ships, as you can see, are limited by the supply of material and steel yards have all they can take care of for some time to come.

"It looks like wooden ships. Moreover, Oregon-built wooden ships. First, the raw material is here; second, the development and standardization of the semi-diesel engines (manufactured on this coast); third, the mild climate, living facilities and labor market, and, fourth, the percentage of profit per dollar invested in a 3000-ton wooden vessel with auxiliary engines has been shown to be greater than steel bottoms of larger sizes.

"There are 53 wooden vessels now under construction on the Pacific Coast. It will require 106,000,000 feet of lumber to build them, and they will have a combined carrying capacity of 79,500,000 feet.

"We have nearly 200,000,000,000 feet of standing Douglas fir and pine in Oregon, and 35,000,000,000 feet of other species. That will build a lot of ships.

"Ships and shipbuilding have made 40 new millionaires in Christiania, Norway (a city the size of Portland) in the last two years. Norway is spending $150,000,000 for ships now in the United States. That is three times more than the United States Government proposes to invest for the purpose of inaugurating a new era in American merchant marine.

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AT THE NATIONAL CAPITOL

PERHAPS the most important event concerning shipping which has emanated from Washington during the past month was the announcement of the Presidential appointees for the Shipping Board.

Under date of December 28, 1916, the head of the Steamboat Inspection Service issued a ruling relative to water sprinkling systems on ocean steamers. The ruling holds that ocean-going vessels whose main decks are not open to crew and passengers, are not affected by the last three paragraphs of Section 20, Rule VIII, Page 166, General Rules and Regulations, Ocean and Coastwise, edition of May 13, 1916.

In the Senate Committee on Commerce, Senator Fletcher tried to secure an amendment to the House bill No. 13,831, providing that there be 16 square feet of clear deck space for each passenger on any water craft. This amendment was beaten in Committee, however, and it is doubtful if the Senator will press the matter on the floor of the Senate.

CREW SPACE ON VESSELS

The United States Steamboat-Inspection Service, in a circular letter dated January 5, 1917, addressed to inspectors of the service, published the conclusion of an opinion of the Attorney-General, dated July 26, 1916, relative to whether the words "this act" in the phrase "the construction of which shall be begun after the passage of this act," appearing in section 6 of the seamen's act of March 4, 1915 (38 Stat., 1164), refer to that act or to the act of March 3, 1897 (29 Stat., 687). The circular letter reads as follows:

You are informed that this bureau is this day in receipt, by reference of the Secretary, of an opinion of the Attorney General dated July 26, 1916, relative to whether the words "this act" in the phrase "the construction of which shall be begun after the passage of this act," appearing in section 6 of the seamen's act of March 4, 1915 (38 Stat., 1164), refer to that act or to the act of March 3, 1897 (29 Stat., 687).

The Attorney General, after carefully considering the applicable provisions of the law, concludes his opinion as follows:

"In my opinion, therefore, the words 'this act' should be construed to refer to the act of March 3, 1897, the necessary effect of which will be to make the space requirements of the law apply to all vessels constructed after the passage of that act."

Inspectors are directed to carefully note the conclusion reached by the Attorney General and to proceed consistently with the same in the inspection of vessels subject to the provisions of the seamen's act.

This means that all vessels built subsequent to March 3, 1897, are subject to the "Accommodation" clauses of an act passed in 1913. The unfairness of such a ruling is obvious. Most large steamers will find little difficulty in changing over their forecastles to suit the law, in fact, the great majority of them will require no change whatever, but it is the small craft, the ocean-going tug and similar vessels, that will feel the injustice of making this section of the seamen's act retroactive.

THE SHIPPING BOARD

On December 22nd, President Wilson made public the names of his nominees for seats on the Shipping Board. William Denman, who had much to do with the drafting of the Shipping Bill, is nominated for the term of six years; Bernard N. Baker of Baltimore for five years; John A. Donald of New York for a term of four years; James B. White of Kansas City, Missouri, for a term of three years, and Theodore Brent of New Orleans for a term of two years.

The shipping community, generally speaking, is not altogether satisfied with the complexion of this Board. There has been rumors that some of the members would have difficulty in having their appointments confirmed before the Senate, but this is hardly likely. There is a noticeable disposition to await developments and see just what the new Shipping Board can accomplish. The remarkable power of controlling or attempting to control ocean freight rates that has been placed in the hands of this Commission is regarded by many as a highly dangerous weapon,—as dangerous to the Board as it is to shipping interests.

THE STRANDING OF THE MILWAUKEE

The stranding of the U. S. Protected Cruiser "Milwaukee" on Samoa Beach near Eureka, California, on January 13, is worthy of more than passing notice. Briefly, the Milwaukee went on the beach while in the course of making attempts to jerk the stranded submarine H-3 off the sand. Just as to the exact cause of the Milwaukee's stranding, whether it was due to careless seamanship or to circumstances that could not possibly be foreseen, it is impossible to say before an official investigation has been held, but this much is certain, those who were responsible for the movements of the big cruiser had no business sending her to a very treacherous bit of coast to aid in the salving of a submarine or anything else. If the Navy Department wanted to remove the H-3 from the beach the sensible thing to have done would have been to secure the services of some responsible wrecking company. If, however, the navy felt confident of handling the job, a government tug or even a collier would have been far more useful and would have stood a far better chance of success than the Milwaukee or any other large, deep draft naval vessel.

"OLYMPIC" REFITTING

The information has reached us through the most reliable sources that the big White Star liner "Olympic" is at Belfast refitting as a passenger liner. A circumstance which might be construed as meaning that peace is nearer the surface in Europe than most people imagine. The "Olympic" is Britain's greatest transport and has been employed steadily since the start of the war in ferrying troops.

OUR COVER

The cover design of the **Pacific Marine Review** this month is one that cannot fail attracting wide attention. The picture is a reproduction of a Christmas card from the pencil of Jas. Cornish, late Chief Surveyor to Lloyds, London. Mr. Cornish was highly noted for this class of work, and was honored with the production of much of the art work on invitations, etc., in connection with the jubilee celebration during the reign of Queen Victoria.

THE COMING SHIP

Elsewhere in this issue will be found an article under the above caption, prepared by D. W. & R. Z. Dickie, well known San Francisco naval architects. The article compares the full powered with the auxiliary oil engine driven vessel, and indicates that the former type is the ship of the future. The prediction is a bold one, and before subscribing to it most people will wish to make a large number of very important reservations.

As to the economical value of an auxiliary powered vessel as compared to a full-powered craft, this is a question which will hardly bear general discussion since the circumstances surrounding the use to which any particular boat is to be put usually creates a case that must be settled individually. As to the oil engine entirly replacing reciprocating steam engines and steam turbines there is a different story to tell, for one great stumbling block lies in the way.

The internal combustion engine is being steadily improved, and has reached the stage where its reliability compares favorably with that of the steam engine; large motorships have been in operation for five or six years, and their expense accounts show that the engine room upkeep and repair bills are practically the same as those of a similarly powered steamer; a slight saving is probably achieved in engine room crew wages and food, and finally comes the trump card of the internal combustion engine: the tremendous and admitted saving in fuel. Now, it would seem, in view of the fuel saving, the admitted reliability and the rapidly growing supply of engineers capable of handling them, that the Diesel engine would make a clean sweep. Here on the Pacific Coast, the great point in favor of the internal combustion engine is accentuated since our coal is high and our oil is low in price. Oil, however, cannot remain around its present figures for many years. In fact, the day may come, unless the engineers and chemists discover some new fuel, when the internal combustion engine will have to hold its own against the old reciprocating engine and steam turbine on the merits of its reliability, weight, space occupied and flexibility rather than on its economy in fuel.

The article on "The Ship of the Future" is one which should bring forth some interesting comments from our readers, and the **Pacific Marine Review** will be pleased to publish any matter that is sent in for that purpose.

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Marine Insurance in 1916

ONE great feature in the year has been the enormous increase in the values of steamers. In the case of British steamers, the insured values have been increased by 50% to 100% on the values arranged last year. Some of the American steamers have also been considerably increased, but it was noticed that most of the fleets operating on the East Coast of the United States, were renewed at the same rates and on the same values which have been in existence for the last year or two. This is bound to have an unfortunate effect on underwriting figures owing to the enormous rise in the cost of repairs.

Another point to be considered is that owing to general shortness of tonnage, American steamers, which hitherto have been employed in the American coasting trade, have been diverted for voyages all over the world. In the Atlantic very many boats which under ordinary circumstances would never have been sent across the ocean have been making voyages to the Mediterranean and to ports in the United Kingdom or France. Even when additional premiums have been paid for the extra risk entailed, there is some uncertainty whether underwriters will make anything out of the ventures.

American underwriters are understood to have done well out of war risks. Sinkings in the Atlantic have not been numerous, and in the case of steamers sunk in the Mediterranean bound from the United States to Italy, the extra premium received more than balanced the account. Except for two periods, the rate of 1% was current for trans-Atlantic voyages until November. The exploits of the "Moewe" in January forced up rates, but there were no heavy losses. There was a stiffening in rates all round in the month of March, which was reflected in the rates across the Atlantic, and up to 2½% was paid. Rates then fell away, and, except for a short time, owing to the German submarine exploits off Nantucket, the rate remained at 1%, without any alteration. Although losses in the Atlantic were comparatively small, sinkings in other quarters forced rates up all round, and trans-Atlantic rates rose in sympathy. All through December the current rate was in the region of 5%, although shipments by the best liners could be insured for 3%.

Marine losses were fairly heavy, and owing to the enormous amount of tonnage crossing the Atlantic it is not surprising that the losses were severe in this quarter. The "Thessaloniki," bound from Patras to New York, was abandoned, and the "Georgios," bound from New York to Piraeus, was missing. The "Pollentia" and "Chasehill" both foundered. The "Suevier" was abandoned on fire, and the "Takata Maru" and "Jacob Luckenbach" were sunk by collision. The "St. Catherines," "Sibiria" and "Quebra" were wrecked, and the "Enrico Mills" was sunk by collision in the Mediterranean. The "Orleanian" is missing on a voyage from New York to Malta, and the "Presidente Viera," bound from New York to Bordeaux, is badly ashore at Ile d'Oleron. Shipments from United States ports to Vladivostock were specially unfortunate. The "Senju Maru" and "Rio Pasig" are missing, while disaster overtook three other steamers. The "Australian Transport" and "Kenkon Maru" were both badly ashore for some time, while the "Wisley" was seriously on fire and had to be beached. On the Pacific Coast there was the loss of the "Bear" at Cape Mendocino, and the serious fire on board the "Congress." The "Roanoke" foundered when bound from San Francisco to Valparaiso. One of the heaviest hull losses of the year was that of the "Chiyo Maru" of the Toyo Kisen Line, which was wrecked near Hong Kong.

It is a long time since losses by fires have been so numerous. Many of those in cargoes shipped in the United States are thought to have been due to German influence. Owing to a more effective control during shipment, the outbreaks during the last half of the year were of a trivial character. Fires, however, were reported on nealy all import-

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AND BRITISH COLUMBIA, 264 COLMAN BUILDING, SEATTLE, WASHINGTON

ant voyages, and there were a large number of outbreaks in cargo awaiting shipment. An interesting case of the latter was furnished in a judgment given in the City of London Court in December, when the Alaska Portland Packers' Association sued Lloyds underwriters for a return of premium for the marine risk on salmon to be shipped from Bristol Bay to Seattle. It appeared that part of the shipment was destroyed by fire at Bristol Bay before shipment, and an attempt was made to get the marine premium returned. This is the first case of the kind which appears to have been brought into court, and judgment was given in favor of Lloyds underwriters.

Business in the overdue market was fairly brisk throughout the whole year. In addition to out-of-time risks, high rates were paid from time to time on steamers which were a little overdue, consequent on the possibility of sinking by submarines. In one or two cases very high rates had been paid before the steamers arrived safely. Only in one case, that of the "Angelina," was a rate of 90 gs. paid on an arrival, but two ships, the "Bonneveine" and "Dolbardarn Castle," turned up after 65 gs. had been paid. Three steamers, the "Sorland," "Tokio Maru" and "Graciana" arrived after 80 gs. had been paid, and the "Strathclyde," which broke down in the Atlantic, reached port after 75 gs. had been paid on her. In the case of steamers ashore, the highest rate was reached on the steamer "Tellus," which stranded on the breakwater at Colon when leaving the canal. Up to 80 gs. was paid against the risk of total loss, and the same rate was paid on the "Matatua," beached after a serious fire at St. John. Three steamers stranded on the Eagle rock outside Ardrossan, but all were eventually floated. The "Elsiston" and "Hjortnes" reached 70 gs. at one time, and up to 60 gs. was paid on the Dagrun. The "Yubari Maru" and "Australian Transport" were both floated after 60 gs. had been paid, and up to 50 gs. was paid on the Kenkon Maru," ashore for a long period after leaving Seattle for Vladivostock. Up to 50 gs. was also paid on the steamers "Arachne," "Fofo" and "Petra."

Several large salvage awards were made in the Admiralty Court during the year. The largest award of $40,000, was awarded to the Greek steamer "Antonios M. Mavrogordatos," for towing the steamer "Exford" to Bermuda. An award of $21,250 was awarded the "Baron Cawdor" for towing the Greek steamer "Thessaloniki" to Bermuda, so that honors were almost even. The "Moorish Prince," which towed the "Indo Maru" to safety received $25,000. The arbitration awards to salvors at Punta Arenas for services rendered to three steamers which stranded in the Straits of Magellan, although considerably less than the amounts demanded, were very large. Underwriters on the "Santa Clara" have to pay $130,000, those on the "North Pacific" $125,000, and on the "Epsom" $100,000. It was the unfortunate closing of the Panama Canal which caused these steamers to be diverted by the Magellan route with such disastrous results.

Early in the year the war risk clause which had been unchanged for the last 15 years, was amended owing to a legal decision, so that in addition to the risk of capture, seizure and detention, it now includes the restraint of princes and rulers. During the year, also, the Government War Risk Department arranged to include the risk of cargo in craft to or from the vessel. Up to that time the Government war risk policy covered only to or from the ship's side.

Two very important amalgamations were reported during the year. The Reliance Marine Insurance Company was acquired by the Guardian Fire and Life office, and although the marine business will be carried on as heretofore, the control will be in the hands of the larger company. The other case was somewhat different. The British Dominions General Insurance Company, which was established as a marine company in 1904, bought up the Eagle Life office, which was established in 1807. It had previously acquired the North Western Company, which was a fire office, and the Commonwealth Company of Melbourne, which transacted fire and marine business.

Freight Report

By PAGE BROTHERS

SINCE our last, about December 20th, the French sailer "General de Negrier" was chartered from this port to the West Coast of U. K. with barley by Strauss & Co. at 155 shillings per ton, option of London or Ipswich at 160 shillings, the highest rate ever paid for a sailer in that direction. The fine new Norwegian steamer "George Washington" (worthy of her name) has been laid on the berth to Copenhagen and Christiania by the Norway Pacific Line, and we understand was rapidly engaged at from $40 to $45 per ton.

From the North, the British Admiralty have named the British steamer "Wearwood" to load wheat from Portland to U. K., which is to be loaded by Balfour, Guthrie & Co., but the Government does not report the rate paid.

Time charter rates have advanced. For instance, the "Talbot," chartered about a month ago by Furness, Withy & Co., for one year at 35 shillings, has just been relet by them to Andrew Weir & Co. at 38 shillings, a neat little profit of practically $100,000, and parties in London yesterday chartered the "Henrik Ibsen," delivery and redelivery Japan for twelve months, at $15,500 monthly, for general trading but excluding Europe and the Mediterranean, and other forbidden places. This means that she gets better than 40 shillings per ton on her dead weight. Another steamer has also been reported at the same rate of freight, 40 shillings, for one year, but this we cannot vouch for definitely.

For the Orient, Andrew Weir & Co., as charterers, chartered the steamer "Capto" to Comyn, Mackall & Co., for lumber from Columbia River to Bombay at 200 shillings per thousand feet. Mitsui & Co. are reported to have sold another cargo in the same direction, but steamer has not yet been reported by them. The Canadian Trading Co. also reported to have sold a cargo, by a motor boat, from British Columbia to a port in India, probably Bombay or Calcutta, at a rate of freight of about 215 shillings. The China Import & Export Lumber Co. chartered motor boat "Seaborne" from Puget Sound to Shanghai at $25 per thousand, and also a smaller vessel, not yet reported, at the same rate. The Robert Dollar Co. chartered "Sanno Maru," delivery and redelivery Japan, for one round to this coast at about 15 yen. Japanese steamers are now asking 17 yen.

The Pacific Mail S. S. Co. chartered steamer "George W. Elder" on time for about three to six months, on private terms. The British steamer "Twickenham" has been chartered by the United States Government to bring coal from Norfolk to San Francisco at $7.50 per ton, vessel to be free of stevedoring, and tolls, through the Canal, payable by the Government.

One or two steamers controlled on this coast have been chartered for nitrate from Chile to North of Hatteras at $20 per ton, and then with coal to a Brazilian port at $17 per ton, the latter free of port charges and stevedoring, and discharge at the rate of 1000 tons per day.

Lumber freights also show more strength. We quote West Coast at $31.50 to $32 per thousand.

For Australia, two schooners have recently been chartered at 120 shillings Sydney or New Zealand port, and 135 shillings Melbourne, Adelaide or Port Pirie.

For Africa and U. K., nothing has been done, but we quote them, respectively, 240 shillings and 280 shillings.

CHANGES IN LLOYDS' COMMITTEE

Sir John Ellerman, Bart., Sir Owen Philipps, K. C. M. G., M. P., also Daniel Stephens and W. G. Noble, both of Newcastle-on-Tyne, have been elected members of the Committee of Lloyds' Register of Shipping.

Sir John Ellerman is chairman of the Ellerman Line, which recently acquired the Wilson Line of Hull.

Sir Owen Philipps is chairman of the Royal Mail Steam Packet Company, Union Castle Line, Elder Dempster Line, and director of the Pacific Steam Navigation Company, Lamport and Holt Line, H. & W. Nelson Line, and other steamship companies.

Messrs. Stephens and Noble have been elected to fill the vacancies caused by the resignation of Mr. J. Knott and Mr. J. B. Adam. The latter named gentleman resigned on account of advancing years. For twenty-five years, both in Great Britain, United State and Canada, Mr. Adam's services to Lloyds' Register of Shipping have been invaluable. He visited the United States in 1900, when only 62,000 tons of shipping was being built to Lloyds as compared with the very large tonnage being built to Lloyds today.

Mr. Andrew Fletcher, president of the well-known marine engine building firm of W. & A. Fletcher Co., Hoboken, New Jersey, has been elected president of the American Locomotive Company.

Our Earliest Shipbuilders

By J. WYLLIE

A pair of Indian canoes. Note the fine lines.

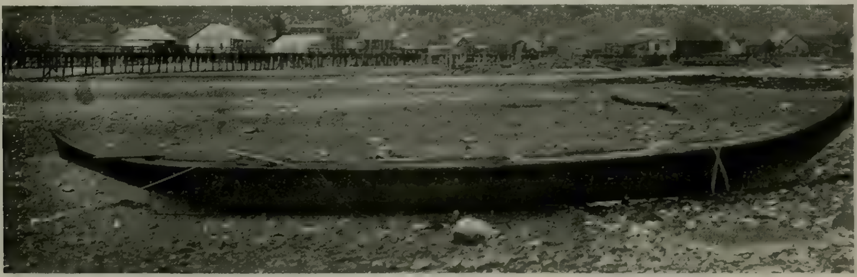
IN these days of million dollar plants and ten thousand ton freighters turned out in batches, when the deafening roar of pneumatic tools is heard on every waterway, suppose we take a look back about a century and a quarter to the birth of the shipbuilding industry on the Pacific Coast.

It may be well to start as near the beginning as possible—with the native craft. When the Russians, for whom the "Star of Empire" reversed its light, drove their crazy vessels towards the shores of the great land to the eastward, they found the native inhabitants of those treeless coasts navigating the stormy waters in frail skin canoes. These oomiaks and kayaks, renamed by the Russians bidars and bidarkas, doubtless antedated the dug-out canoes of the lower coast as sea-going craft, and are still in general use from Cook's Inlet to the mouth of the MacKenzie river.

As the natives of the coast between Puget Sound and Icy Straits did not have to seek a living outside of the islands, it is not unlikely that until the advent of iron tools their canoes were rather crude affairs, in which the long cruises of later days would have been impossible. If stone tools were ever used by the natives of the Alaskan coast in fashioning their boats no trace of them is to be found, and they have been so long forgotten that I have been unable to learn anything of them. As the natives already had large, well-made canoes and iron tools when the Spanish and British explorers first reached the coast, it is likely that these tools had been procured from the skin-boat navigators from the westward, who must have been in touch with the Russians. Be that as it may, no product of the boat builders' art has ever been turned out of more graceful form for following the lines of least resistance than the dug-out canoe of the northwest coast. Many of these may still be seen hauled out on the beaches and rotting in the grass at the native villages, having given way to that universal friend of the poor man, the gas-boat.

A brief sketch of the method employed in the construction of these canoes should prove of interest to **Pacific Marine Review** readers. While plenty of fine timber was available close to the waterways, a tree grown on higher land was usually selected as being of slower growth, and, therefore, less porus. When a suitable tree had been located, the builder in many instances moved his camp out to the work, it being easier to transport the finished canoe to the beach than the huge log. Possibly there were other reasons which one who has ever built anything where there were idlers will appreciate.

A log having been cut to the required length, one side was hewn to conform to the sheer of the boat. The log was then rolled over with the flat side down, and the builder proceeded to shape the outside. Most people who have seen these canoes have wondered how the builders were able to preserve a uniform thickness, and many of these inquirers are still in ignorance of the methods employed. When the outside was shaped to the builder's liking, it was smoothed down with fish skin and lines, a few inches apart, drawn from gunwale to gunwale across the bottom with a piece of charcoal. Tiny holes were then bored at intervals along these lines by which to gauge the thickness of sides and bottom. A few inches below the gunwales, which were about two inches in thickness,



An Indian canoe drawn out on the beach. These canoes leave scarcelv a ripple when passing through smooth water.

A three-man canoe. The natives navigated the open ocean in these craft, thus proving their exceptional staunchness and seaworthiness.

the holes in the sides were bored to a depth of about one-half an inch, tapering to two inches on the bottom. Into these holes were inserted pins made of red cedar or of other wood dipped in paste made of charcoal and oil. The boat, or log, for it was still solid, was then turned over and shored, and the work of hollowing begun. The best method was to chop out only a trench along the middle and then burn it down nearly to the required thinness. Burning was preferred to hewing, all of the chips hewn from the log being saved for the former purpose in conformity with the ancestral idea that by using only its own wood the original substance was preserved.

A big canoe rotting on the beach. Some idea of the size of these big dugouts is gained from the figure of the man by the prow.

In burning, great care had to be exercised, and the children were busily employed keeping the fire in check with damp moss. When burned as far as advisable, the builder resumed work with his adze, hewing carefully and keeping close watch for the redwood "spills" or black paste, which showed when he had reached the proper thickness. If the log was not quite thick enough to allow the desired breadth, the sides were steamed by filling the boat with water into which hot stones were dropped, and then by means of spreaders the necessary beam was gained. In accordance with ancient custom, before the boat was oiled or painted, it was hauled to the beach and sunk for several

A large skin canoe leaving the beach at Nome, Alaska. The earlier natives probably kept in touch with the Russians by means of these craft.

days, in the belief that from the water having a good chance to destroy it and failing it would not try to do so again. Well, there are a good many things beyond the reach of our philosophy, and for people who live by the water and on the water as much as they do, fatalities among the Siwashes due to that element are exceedingly rare.

In the great canoes, many of them over fifty feet in length, in which the warlike Hydahs, Thlinkets and other tribes conducted their naval battles, huge pieces of wood, weighing several hundred pounds and trimmed to a cutting edge, were fitted onto the stems for war-heads with which to ram opponents. Propelled by twenty pair of stout arms paddling in unison to a rhythmic chant an astonishing rate of speed can be maintained, and of such fine lines are these canoes that, but for the paddles, scarcely a ripple would appear to show where they had passed.

Efficient Shop Handling

ONE of the last great opportunities for economy in the machine shop, the foundry, at railway terminals or on wharves and docks lies in the handling of materials, whether these materials be freight or unfinished products passing from one stage of manufacture to another. The cost of producing power, the cost of transportation, both by land and sea, and the efficiency of nearly all classes of machine tools have been brought to a stage where no marked economies in production or marketing expenses may be looked for through their improvement.

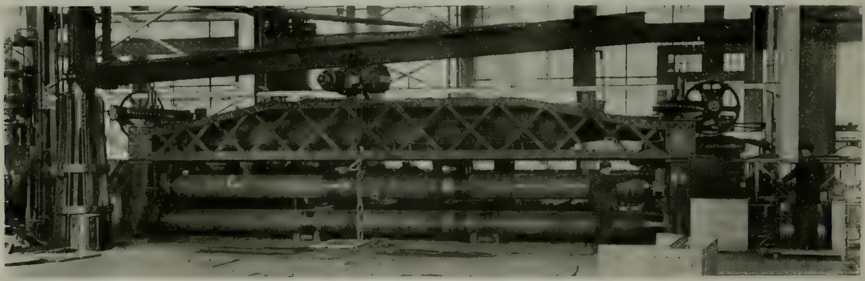


Fig. 1. A special self-supporting bracket crane, 3 tons capacity, 30-foot reach, used for serving what is said to be the largest bending rolls in the country. These rolls can cold bend plate 2 inches thick.

Grain, coal, iron ore, in fact, all bulk cargoes, where they are handled in sufficient quantities to warrant special equipment, are handled as economically in the United States as anywhere in the world. It is in the handling of general freight, both at land and water terminals, that the United States has lagged behind. Of late years, however, there has been a marked tendency throughout the country to take advantage of hoisting and conveying systems specially adapted to the handling of general merchandise. Many of the newer railway and shipping terminals are equipped with modern handling equipment that has resulted from the realization that terminal costs on freight often exceed the transportation cost from one section of our country to another or from a foreign port to an American one. The work of such engineers as H. McL. Harding and others who are not only installing modern terminal equipment in plants entrusted to their charge, but also preaching the doctrine of handling economy throughout the Scientific Press of the United States, is rapidly bearing fruit.

In one sense the tardiness of this country to take up handling equipment at terminals where general freight comprises the bulk of the commodity movement, has been greatly in our favor. Throughout Europe and Great Britain, and in many of the larger ports of South America, widely varying methods of mechanical freight handling are in vogue, with a resultant mass of data made available for the use of American engineers. Those in charge of American terminal projects have the opportunity to chose types and arrangement of machinery that have proven themselves most fruitful in economy. This is an asset which, if taken full advantage of, should transform many American terminal plants from the most wasteful to the most economical in the world.

One need not look to foreign countries, however, for examples of efficient handling. In many of our great industrial establishments this problem has been thoroughly solved under conditions fully as exacting as those that exist in a marine terminal. The problems of the terminal and the large machine shop, foundry or ship tool shed are in many ways analogous and therefore a short study of the handling installation of a modern shop is of twofold interest.

The illustrations herewith picture a part of the

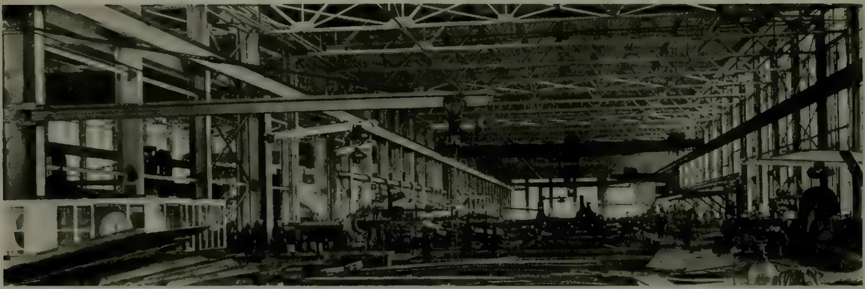


Fig. 3. General view of the right hand bay of the shipfitting shop. The crane in the foreground is a 5-ton, 40-foot effective reach jib crane, equipped with a 5-ton electric hoist. This crane serves the scale house and loads or unloads narrow gauge cars pulled by storage battery electric locomotives.

handling equipment supplied by the Shepard Electric Crane and Hoist Company, Montour Falls, New York, in the shops of the Fore River Shipbuilding Corporation at Quincy, Massachusetts. The mechanical handling of material in the shops of this plant, aside from outside handling and the crane system about and over the building berths, consists of three distinct sets

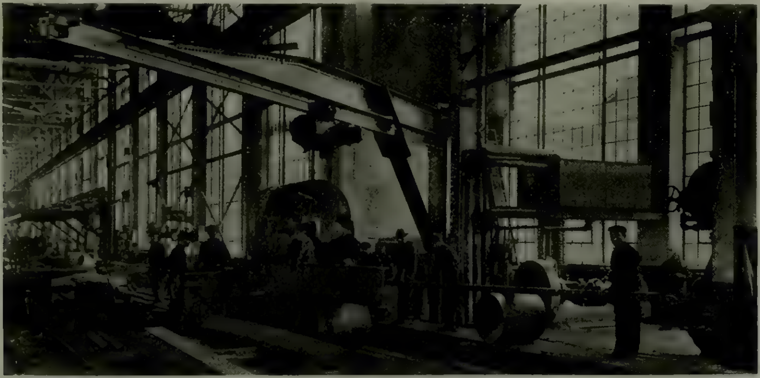


Fig. 4. A 3-ton, 30-foot reach bracket crane, equipped with a 3-ton double part hoist, which is used for serving a hydraulic bulldozer.

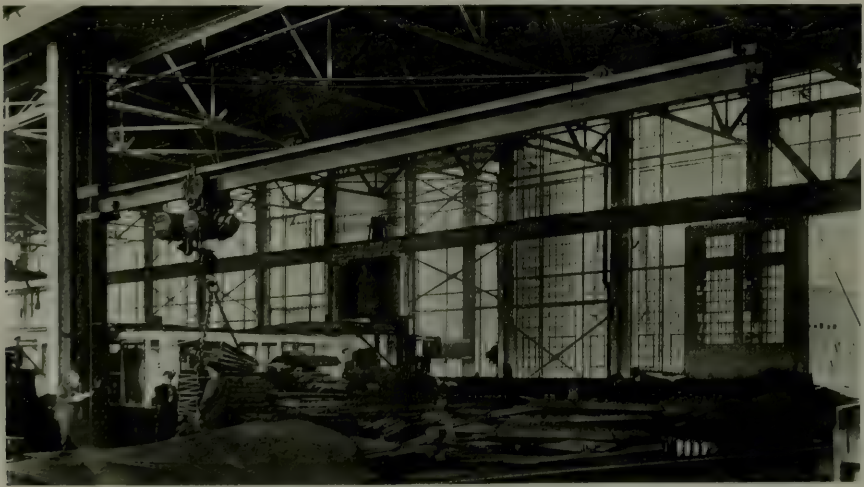


Fig. 2. View of a 5-ton, 2-motor jib crane, directly over a load deposited on one of the electric trucks. All of the material fabricated in this building passes through the open door shown in this picture.

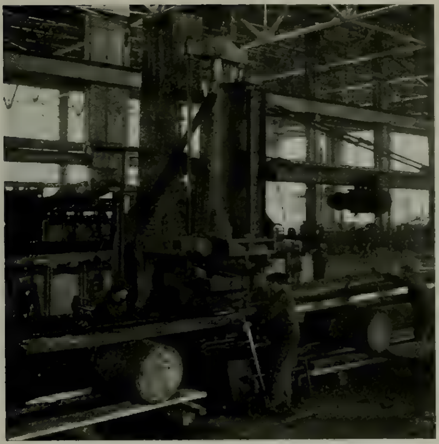


Fig. 5. A 3-ton bracket crane mounted on a hydraulic bending machine. The plate shown in this picture is 1¼ inch thick, and is being bent cold. The furnaces in the background are used principally for heating shapes.

of units: the overhead traveling cranes which travel the length of the shops and which are used for conveying materials of great weight; electric cranes and hoists working on swinging jibs and brackets for handling plates and shapes, etc., in and about heavy tools and also for loading material onto the third transportation system, electric trucks, which haul trailers on narrow gauge tracks about the floors of shops and outside about the yard and to the building berths.

In figure 1 is shown a very special, self-supporting bracket crane of three tons capacity and thirty-foot reach, which is used for serving what is said to be the largest set of cold bending rolls in the United States, being capable of handling plates up to two inches in thickness. At the left of the picture is a hydraulic bending press served by a similar self-supporting bracket crane. The advantage of efficient handling equipment for feeding these heavy tools is very obvious, as the economies gained through their use might be easily offset through inefficient means of handling the material to and from them.

A closer view of a 5-ton two-motor jib crane is shown in figure 2. The crane is shown directly over a motor truck on which it has just deposited a load and through the open door can be seen the delivery center to the shipyard, all of the material fabricated in this shop passing out through this door to its ultimate destination.

In figure 3 we have a general view of the shipfitting shop from the yard end of the building. The view shows the right bay of the shop and was taken at noon time. The crane in the foreground is a five-ton, 40-foot effective reach, jib crane, equipped with a 2-motor, 5-ton electric hoist. This crane serves the scale house and also loads and unloads narrow gauge cars pulled by storage battery electric locomotives.

In figure 4 a three-tone, 30-foot reach, bracket crane equipped with a three-tone double part hoist is shown. This crane serves a hydraulic bulldozer.

The next photograph, figure 5, is another example of individaul crane service for a heavy tool. This is a three-ton bracket crane, mounted on a hydraulic bending machine. This machine is shown bending a 1¼-inch plate cold, while in the background are furnaces used in heating shapes which are to be bent on the table also shown in this picture.

A view of the shipfitting shop taken from the opposite end of that depicted in figure 3 is shown in cut number 6.

A Shepard Electric Crane and Hoist Company standard Form 23, Class A-4, three ton, 2 double part reave electric hoist mounted on a self-supporting bracket crane is shown in figure seven. The machine which this hoist serves is a heavy punch used on deck beams and ship frames.

A three-ton electric hoist mounted on a jib crane of 35 feet effective reach, is shown in figure 8. The shop machine shown in this photograph is a motor operated friction saw. This is an excellent photo of a cutting operation as the sparks can clearly be seen flying from the bar, the picture being taken at the moment the machine was coming into a heavy section of 15-inch ship channel. The saw made a cut through this section in fifteen seconds.

In figure 9 will be seen a hoist similar to that shown in figure 8. This hoist is mounted on a special type 3-ton, 30-foot jib crane, and is used for serving an angle shear.

From the photographs herewith it will be clearly

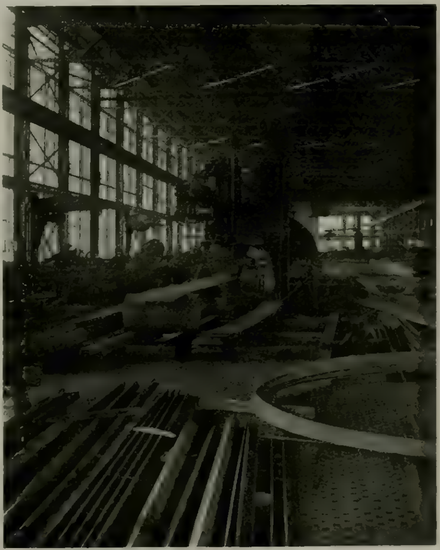


Fig. 6. This view is taken from the opposite end of the building in the same bay as shown in Fig. 3.

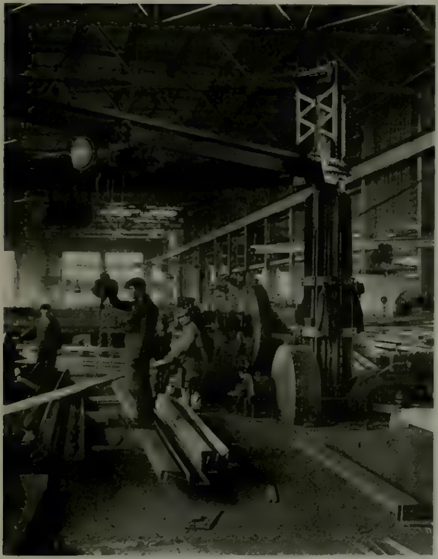


Fig. 7. A 3-ton, 2 double part reave, electric hoist, mounted on a self-supporting bracket crane. The machine shown is a heavy punch used for punching deck beams and ship frames.

seen that the designers of modern shop lay-outs are paying more and more attention to the feeding of work to the heavy tools. The use of individual hoists for serving large machines results in an appreciable saving in time in setting up work, and thus insures a big increase in output. This is one of the important items that insure the economical success of heavy and costly machines.

It may seem a far cry from shop handling equipment to terminal handling problems, but there is much to be gleaned from the experience of modern machine shops that bears directly on the handling of freight at both land and water terminals.

The hoists pictured with this article are all Shepard apparatus, and a great proportion of this firm's output is well adapted to marine terminal work, in fact, combinations of standard apparatus may be made to suit the requirements of practically any special installation. Whether electric handling equipment be installed in a shop, in a warehouse or on a wharf, it is usually more or less inaccessible for frequent and regular overhauling and cleaning, and, therefore, one of its principal enemies is dirt. In the Shepard apparatus this trouble has been practically eliminated through enclosing the motor and gears in a dust and oil proof casing and operating the gears in an oil bath.

LOCAL WIRELESS MAKING STRIDES

The Haller-Cunningham Company has lately been kept busy attending to new installations up and down the coast. During the past few months about twenty-five vessels have been equipped with the apparatus made by this firm. The Haller-Cunningham apparatus is sold outright and not leased, a feature that seems to appeal to a good many owners.

WATERHOUSE REORGANIZATION

The close of 1916 was marked by several important changes in shipping firms, one of the most important being the formation of Frank Waterhouse and Company. This concern was formed to absorb the Frank Waterhouse and Company, Inc., and the Wellington Coal Company and other Waterhouse concerns. The chief business will be the operation of a large fleet of freighters and handling coal trade. Frank Waterhouse and Company is incorporated for $450,000, and the officers are: Frank Waterhouse, president; N. H. Begley, first vice-president and secretary; Joseph Waterhouse, second vice-president, and J. R. Lane, treasurer.

JAPANESE LINE PROFITS

The Nippon Yusen Kaisha for the last fiscal term paid a dividend at the rate of 28 per cent per annum. The balance sheet shows gross income of $19,443,848; gross expenditure, $9,585,693; reserve for depreciation of vessels, $697,773; reserve for shipping insurance, $386,697; reserve for extensive repairs, $162,824; reserve for depreciation of buildings, $14,823; net profit, $8,596,038; brought forward, $3,504,224; total, $12,100,263; reserve, $428,803; directors and auditors, $99,700; 8 per cent dividend, $548,350; 2 per cent extra dividend, $137,087; 18 per cent extraordinary extra dividend, $1,233,787; special war allowance for employes, $199,400; carried forward to the next term, $9,452,136.

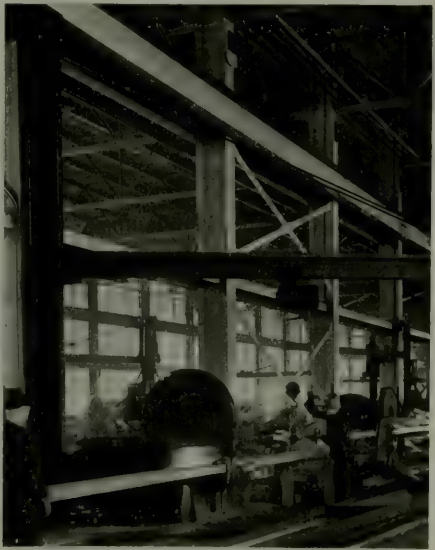


Fig. 8. A 3-ton electric hoist mounted on a jib crane of 35-foot effective reach. The machine is a motor operated friction saw, shown coming into a heavy section 15-inch ship channel. The saw cut through the channel in 15 seconds.

European Marine Notes

Exclusive Correspondence of "Pacific Marine Review"

LONDON, Jan. 1, 1917.

A NEW feature in shipping since the advent of the new Government has, of course, been the appointment of Sir Joseph Maclay as Shipping Controller. Sir Joseph is credited with knowing a very great deal about the management of "tramp" steamers, and he is also credited with being personally averse to the policy of requisitioning that remaining portion of the British mercantile marine which is not already in Government hands. If so, then the question becomes one of whether the Government's policy will be entirely subject to the views of the Controller. He is also credited with desiring to associate with him in his new office, which will be separate from the Board of Trade, men who thoroughly understand the working of the shipping trade from practical experience.

Although actually the profits of shipping are a less important matter to the country than extreme efficiency in the employment of all tonnage, with which it is assumed the new Controller will directly concern himself, yet it is a matter of very great interest.

In the early part of last year the requisitioning of the whole of the mercantile marine by the State was strongly advocated as being by far the fairest method of dealing with the shipping problem. The proposal then advanced was, roughly, that owners should be remunerated fairly by terms based on the original value of the ships, together with a commission on the profits, in order to ensure that they had a direct interest in the economical and successful management of the tonnage. Since then the position has undoubtedly been complicated, both by the amount of tonnage which has been changing hands at ever-increasing prices and by the advance in the rates paid for the hire of neutral steamers. Terms which would have been satisfactory to owners then would probably be regarded as quite insufficient by, say, those who have paid $750,000 for a steamer which before the war might have been valued at $150,000.

To what extent owners who have chosen to pay fabulous prices for second-hand tonnage are entitled to consideration is a matter in which there is room for divergence of opinion. The case of the owner who has seized the opportunity to sell a particular vessel at an enormous price in order to buy another, also at a high price, which is more suitable to his trade can be understood. Likewise the case of owners who have sold vessels with the idea of investing the proceeds in new tonnage at an early, favorable opportunity, calls for sympathetic consideration.

It must also be recognized that those who have paid enormous prices for new vessels are not necessarily strengthening the British mercantile marine. These owners, with their ships standing at inflated prices, will not be in a favorable position to meet foreign competition at the end of the war, because high freights may be necessary to their existence. On the other hand, owners who have retained their ships should have them at the end of the war written down to practically nothing, and will consequently be most favorably placed to meet competition of any sort.

Problems such as these must arise now if, as is generally believed, the shipping position is being re-examined afresh. Further, there is the anomaly that while steamers requisitioned by the Government received a rate of hire of about $1.75 a ton deadweight per month, those British steamers which are free, small though the number may be, can earn in the market about $7.50 a ton deadweight per month. There are those who still maintain that, in spite of the complications which have cropped up during the past year, a fair method would still be for the Government to pay all owners rates of hire possibly in excess of those provided for by the Blue Book scale, and take the surplus profits. If this course should be adopted the Government would have to make foreign competition after the war a matter for its particular care.

Shipowners and State Control

I have asked several well known shipowners what they thought of the Government's decision to take over the control of the country's merchant shipping. "If," said one, "you can tell me what the scheme exactly is I will be glad to give you my opinion on it. There are several ways in which such a control could be exercised, and until we know which of them the new Government favors it would be futile to discuss the matter." Another shipowner said that he was unable to see how direct State control could be more efficient than the control which the existing control committees were exercising. "At present there is," he remarked, "real scientific control, and the available tonnage could not possibly be more economically utilized than it is." It was suggested to a third shipowner that in undertaking to assume control of the shipping industry the Government hoped that the effect of the action would be to bring down food prices. There might, this shipowner admitted, be a lowering of prices. "But," he said, "it will be so slight as to be really inappreciable." All the others with whom I discussed that aspect of the subject took the same view. There was, too, unanimity that the man in the street greatly over-estimated the profits of shipping, taking the industry all over. It was pointed out to me that where the profits were above normal average the community reaped the greater benefit. The excess profits tax absorbed most of the margin, and where the profits were earned abroad the shipowners were obviously helping to win the war by bringing money into the country. "The position I take up," observed another owner, who is in close touch with all that is happening, "is that if the Government thinks it can control the industry better than it is being controlled at present it ought to be allowed to make the trial. But," he added, "shipowners have a right which cannot be ignored to be heard on the subject of the scheme to which it has committed itself before that scheme is put into operation. To except that is only to look for ordinary fairness."

New Ships: The Shipbuilders' Suggestion

Things have now reached that point in shipping and shipbuilding affairs when something urgent is to be done to meet the scarcity of ships. I learn that there has been an exchange of views among shipbuilders, and the policy which finds general favor might be outlined in this way. The ruling factors are the quantity of labor and steel available for munitions and ships. The problem as put before me by a very well-known shipbuilder is the most economical use of steel and labor to produce the type of ship to give the greatest carrying capacity. Up to now shipbuilding has been carrying out the ideas of shipowners, with a hundred different requirements and preferences. It has meant the building of liners with a high proportion of elaborate carpentry work and expensive use of material and labor. The traveling public has shrunk so much that the liner problem may be left alone till the war is over. The first necessity is cargo-carriers. In the near future there will be many berths vacant in the yards for mercantile shipbuilding. If the shipowners (the shipbuilders argue) invite tenders for different classes of vessels, it will occupy the valuable time of draughtsmen and designers all over the country, and the pattern-shops will be turning out a huge number of patterns slightly different from one another and occupying an enormous amount of labor and space. An instance of what this means may be seen in the fact that 40 patterns of stern frames may be turned out in the different yards for a certain type of ship that is to all intents and purposes the same.

The shipowners believe that unless the thing is tackled by the Admiralty it will be impossible to get shipowners to agree to a standardized pattern and to sequence of delivery. The suggestion which was mentioned to me is revolutionary, but no more so than the other things the nation has found itself obliged to do in the war.

The Standardization Scheme

It is proposed that the Admiralty itself, which requisitions so enormous a proportion of our shipping, should itself order and take delivery of the new ships. A committee of shipowners should agree upon what is the best type of cargo-carrier to meet the present situation. This type should then be reviewed by a committee of shipbuilders, and the result would be the standardized cargo ship. Or the arrangement should be reversed. Another plan would be a joint committee of shipowners and shipbuilders, but I believe the first idea is most approved. The Admiralty might have a final say, and would have the placing of the contracts in the different yards. Admiralty officials are now concerned with the working of all yards and engine shops, and would be able to allot the orders where they could be most conveniently and economically carried out. Instead of draughtsmen in all the yards making out their plans and specifications, one set of draughtsmen could do the whole business, and the economy in the pattern shops and in other departments would be enormous. But I need not go into the advantage of the standardization of ships. Its economies are vast, and, owing to the shipping situation, when diversities of type are not an important factor, standarization can be worked to its last ounce, not only for the economy of the men it employs, but for the economy in men set free for other employment.

It might be argued that this would put an enormous power in the hands of the shipbuilders, and that at the end of the war the Admiralty would be left with an enormous amount of tonnage in hand which would have to be sold at slump prices. The reply to that is that the Admiralty officials on the whole are capable men, already dealing with standardization of warships, and that at the end of the war good deadweight carriers would be as much needed as they now are. The great resources of our shipbuilding yards now employed on intricate Admiralty work would be free to return to the production of the big liner and the ship for special requirements.

Wooden Ships

A forecast of the revival of wooden ships was given at the Baltic Exchange recently when Mr. Kellock sold an old damaged wooden schooner for the very high price of $325,000 to a shipowner from Birkenhead. The three-masted schooner Edith S. Cummins was built twenty-seven years ago of oak and pitchpine in the United States. She is only a 500 tonner, and is lying at Fishguard with her bottom stove in. With the present price of timber, fully $5,000 will have to be spent on repairs, yet the purchaser considered he had a very good bargain in the fact that city brokers are now having to meet a growing demand for wooden ships.

Shipbuilding Delays and Labor

Evidently the scheme recently described by Mr. Runciman in the House of Commons for the pooling of skilled labor at the shipbuilding centers has been formulated not a moment too soon. It is even described by owners as being long overdue. Arrangements, it was stated, had been made in the wear district for the pooling for the skilled labor there, and similar plans were to be extended to other centers. The sooner they can be applied to other ports the better. I hear of one cargo steamer of nearly 10,000 tons deadweight which was launched some weeks ago on the Tyne, while her engines have also been waiting to be fitted into her. But the hull continues to remain useless because the particular builders have not the labor available to carry out the work of fitting. It is stated that, provided that necessary labor could be secured, the vessel could be made ready for sea within a few weeks. Such a case seems obviously one for the pooling of labor. If this vessel is the nearest to completion, the commonsense course is for all the yards to contribute their quota of workers to make the ship ready for sea, and then to concentrate on the ships next nearest completion. The country needs ships ready for service.

West Coast Shipping Matters

SAN FRANCISCO

One of the most significant events of the month in shipping circles was the recent visit of Mr. F. G. Whiting, western manager for the Cunard interests, who secured a twenty-year lease of the ground floor of the Hooker and Lent Building, First and Market streets, San Francisco, for Cunard Line headquarters on this Coast. Instead of the agencies hitherto stationed here, there will be a manager and a regular staff of Cunard employees. From this action it is taken that San Francisco is to be made a port of call on the new Pacific Ocean route of the Cunard liners.

The old "Shna-Yak," now the "Charles Christenson," wrecked last July, salved and overhauled is now operating on the Grays Harbor run for her owners, Sudden and Christenson.

In tow of the steamer "Willamette," the hull for the new steamer "Wahkeenah" arrived at San Francisco on January 14 with 1,500,000 feet of lumber. As soon as her lumber cargo was discharged, the Main Street Iron Works started on the installation of her triple expansion engines.

Fair and Moran have purchased the steamer "Alliance" from the North Pacific Steamship Company. They had been operating the vessel on charter for several months in the San Francisco-Mexico-Central America trade.

Importations from the Hawaiian Islands for the year 1916 were unusually heavy, as will be gleaned from the following items: Sugar, 8,495,349 bags; coffee, 25,035 bags; hides, 16,220 bundles; bananas, 228,537 bunches; rice, 31,602 bags; molasses, 250,836 barrels; fresh pineapples, 14,977 cases, and canned pineapple 3,108,706 cases.

SEATTLE

The department heads and foremen of the Seattle Construction and Dry Dock Company tendered President C. W. Wiley a surprise banquet at Hotel Butler, Seattle, on January 10. The President was presented with a handsome token of the esteem of his fellow workers.

The Union Pacific Railway System will build a modern dock and warehouse on its Seattle waterfront property at the foot of Dearborn street. Actual work on the project will start in the early spring.

The contracts for the construction of two 8,800 ton deadweight freighters for Hannevig Brothers of Norway, which were let to the Anderson Shipbuilding Company, have been turned over by that concern to the Ames Shipbuilding and Dry Dock Company. According to Captain Anderson the reason for the disposal of the contracts to the Ames concern was the difficulty in securing steel. As the Anderson Company was unable to secure delivery of sufficient steel to insure the vessels being built within anything like the contract time it was decided to dispose of the contracts. The Anderson yard, however, is going right ahead with its new buildings and installing new machinery and expects to land other contracts shortly.

On January 9 the Chesley Tug and Barge Company absorbed the Crosby Towboat Company, taking over the tugs Alice, Cornelia Cook, Harold C. and Winona, the first three being steam tugs and the latter a gas boat. In taking over the fleet of the old Crosby concern, the Chesley Tug and Barge Company has increased its own tonnage to quite a degree. Besides the boats named, the fleet now comprises the steam tugs Columbia, Katie and Tempest and the gas tug Chema. In connection with their towing business, ten scows are operated by the Chesley concern.

The John Wilson Shipbuilding Plant on the East Waterway, which has started the year with capacity orders on hand, received a contract on January 6 from the Kadiak Fisheries Company for a $12,000 cannery tender to be eighty feet long and to be powered with a 110 h. p. Atlas engine. The contract calls for delivery by April 20th.

On January 7, the American-Siberian Trading Company of Seattle celebrated its second birthday. This concern has built up quite an extensive export trade in American farming implements and has offices in Petrograd, Moscow and Vladivostok and agencies in New York, Boston and Chicago.

The new steamer Panuco, just completed by the Seattle Construction and Dry Dock Company, to the order of the New York and Cuba Mail Line, held a successful trial trip on Puget Sound on January 14.

Mr. F. G. Whiting, manager of the Western Department of the Cunard Line, with headquarters in Chicago, arrived in Seattle on January 8, in a tour of the Pacific Coast. Mr. Whiting is looking over the shipping situaton on the Pacific Coast in relation to the proposed Cunard invasion of the trans-Pacific business.

Mr. Charles A. Kilbourne, President of the Kilbourne and Clark Manufacturing Company, returned to Seattle from the East on the first of the year with an exceedingly large number of contracts for wireless apparatus for new steamers. The Kilbourne and Clark concern has opened permanent offices in the Singer Building, New York, with Mr. Charles A. Kilbourne in direct charge.

The Seattle Construction and Dry Dock Company launched the U. S. diver N-2 on January 16.

The Skinner and Eddy Corporation launched the 8800 ton freighter "Louise Nielsen," sister ship of the "Niels Neilsen," on January 23. The Louise Nielsen is building to the order of B. Stolt Nielsen, and is 410 feet 5½ inches long by 54 feet beam by 29 feet moulded depth.

The Washington Tug and Barge Company and the Independent Towing Company have purchased from the Columbia Contract Company of Portland, Oregon, the tug "Daniel Kern" and two sea-going barges.

PORTLAND NOTES

Open shop in Portland's shipbuilding plants was returned the victor after a two weeks' strike upon the Northwest Steel Co. and the Willamette Iron & Steel Works, which was partially settled January 16.

The men of the Northwest Steel Co. were granted higher wages, the same scale as in force in the San Francisco yards, and a grievance committee, composed of one man from each craft in the shop, and an advisor, who shall be acceptable to the company, organized to care for all future disputes.

The Willamette Iron & Steel Works is still on the unfair list from the unions, but it is working a force of men capable of caring for all the material that the railroads can deliver, and its officials declare they are satisfied with conditions.

The material shortage is proving a much more trying situation even than was the two weeks' strike. All of the four steel shipbuilding plants are affected and it is feared that contracts not only in Portland, but also in Seattle and San Francisco are to be greatly delayed unless the railroads secure a greater number of cars to devote to the delivery of plates and engine materials.

The entrance into the offshore shipbuilding of at least two more firms seems probable from the present outlook.

Joseph Supple, pioneer boat builder, who has turned out many of the fastest sound and river steamers of the Northwest, is in the East, where it is said he will sign contracts for three large wooden vessels, the type of which has not been announced. Supple has an option on property just above his present yard site, where he will put in the ways for these craft.

W. H. Curtis, who for a time was superintendent of the Columbia Engineering Works yard, has contracts for four vessels secured through a Southern broker, which he will build at the old plant of the St. Johns Shipbuilding Co.

Launching of the McCormick steamer "Latourell" at Astoria and the McCormick motorship "S. I. Allard" at St. Helens, occurred during the latter part of the month. The "Allard" is a sister ship of the "City of Portland." The "Latourell" is a sister ship of the "Wahkeena," now fitting out at San Francisco, and will herself be towed to San Francisco shortly to receive her engines and boilers.

The San Francisco and Portland Steamship Company has altered their schedule to secure a sailing every six days from Portland instead of every seven as hitherto.

The Port of Bandon Commission has reorganized with two new members, W. H. Lyons of Coquille and O. A. Trowbridge of Bandon. The newly-elected officers are: R. H. Rosa, president; J. E. Norton, vice-president; O. A. Trowbridge, secretary, and T. P. Hanly, treasurer.

Machinery for the Albina Engine and Machine Works' plant has been arriving at Portland steadily during the month, and the buildings are rapidly rounding into shape.

On January 16, the St. Helens Shipbuilding Company launched the large auxiliary schooner "S. I. Allard." This fine craft is 278 feet over all, 48 feet beam and 21 feet depth of hold, and will be powered with twin 320 b. h. p. Bolinder engines. The vessel is building to the order of the Chas. R. McCormick Company of San Francisco.

On January 20, Wilson Brothers of Astoria launched the hull of the steam schooner "Latourell," a sister ship to the "Wahkeenah." This schooner will be driven by triple expansion engines with cylinders 13½-23 and 40 inches in diameter by 30 inches stroke. Steam will be supplied by B. and W. boilers. The vessel, like her predecessor, is built to the order of Chas. R. McCormick and Company.

TACOMA

The Pacific Coast Shipbuilding Company, of which Mr. J. H. Hyde is president, is now getting its wooden shipbuilding yard into shape. The site of the new shipyard is on the tide flats between the St. Paul and Tacoma Lumber Company's wharf and the Milwaukee Oriental docks. The concern is prepared to handle the construction of auxiliary powered schooners for the lumber trade.

Work was started early in January on the construction of the Western Boat Building Company's plant at the foot of Carr street, Old Tacoma. This concern was incorporated at the first of the year for $25,000 by M. Petrich, William Dickat and Joseph Matrinac. Contracts for small craft to the value of about $30,000 are on hand.

The Washington Shipbuilding Corporation has leased 27 acres of tide flats from the Northern Pacific Railway. This new shipbuilding site immediately adjoins that of the Seaborn Shipbuilding Company. Mr. McMasters, formerly treasurer of the Alaska Steamship Company, is the active head of the Washington Shipbuilding Corporation, and he has stated that the work of building and outfitting the new shipbuilding plant will be rushed to completion.

A bill has been introduced in the Washington State Legislature, with every prospect of passing, establishing the Washington School of Navigation. This action is necessary in order to take advantage of the Federal Government's school ship offer. The Government provides a corps of instructors and $25,000 per annum for maintenance of the ship allotted. The bill in the Washington Legislature carries an appropriation of $10,000 twice a year as the State's part of the cost. The subjects taught at the Navigation School would be navigation, ship construction, mechanical and electrical engineering, etc. Boys between 16 and 20 years of age would be accepted, but would have to have a high school education or its equivalent. The cost to the scholar would be $110 for the two years' course, which would include long sea cruises.

GRAYS HARBOR

The Endresen Sparyard at Aberdeen has started on what promises to be a record breaking year. Endersen has on hand enough orders to keep his plant going at full capacity for several months. He recently made a large shipment of spars to the Atlantic seaboard and is now engaged on a large shipment for Canadian users, and a big consignment of dredger spuds for San Francisco bay parties.

BRITISH COLUMBIA

The Vancouver Creosoting Company has located a large plant adjoining the Wallace shipyard. The plant has been laid out with the view of ultimate extension to one of the largest equipments of this kind in America. The demand for cedar has resulted in the opening up of a great many timber claims in and about North Vancouver, and the new creosoting plant is favorably located for handling a large amount of the creosoting business of this section.

During the month just closed, borings have been under way at the Wallace Shipyard, North Vancouver, with the purpose of determining the location for a large graving dock.

On January 20, the Wallace Shipyards at North Vancouver launched the "Mabel Brown," 236 by 45 feet 10 inches, molded and to be powered with twin 240 b. h. p. Bolinder engines. The launching was made the occasion for a joyful public demonstration on the part of the North Vancouverites.

DEEP DRAFT SHIP IN CHARLESTON HARBOR

Without the slightest difficulty and on a tide not quite full, the new freighter Edgar F. Luckenbach recently entered Charleston Harbor drawing thirty-two feet three inches of water, thereby setting a new mark for this channel and at the same time conclusively establishing Charleston's claim as a deep-water port. It is generally asserted that Charleston is the only port south of Cape Hatteras that could have been entered by the Luckenbach when she was so heavily laden and the advertisement that the port has received and will receive from this arrival is causing much satisfaction in the South Carolina metropolis.

The Luckenbach was brought into the harbor and up to her dock without the slightest hitch, and this was accomplished too, despite thick weather and ground swells. The vessel was docked two hours after the pilot boarded her, eight miles from shore.

The big freighter is on her maiden voyage, which began June 10, when she carried a cargo from New York to the Antipodes. Then she went to Iquique and Caleta Buena, lost much time because of a dock strike at the latter place, shipped a huge cargo of nitrates and returned to the United States. Because of her great draught, she had much trouble in negotiating the slide section of the Panama Canal. It required an entire day for her to pass through that waterway. After discharging part of her cargo at Charleston, a great nitrate-importing port, she proceeded northward.

The event is the more encouraging to Charlestonians in that it comes at a time when the Charleston Navy Yard is beginning to receive due recognition. The enemies of the yard had long asserted that large battleships could not get to the yard. The easy entrance of the Luckenbach puts to rout all such arguments.

PERSONALS

Mr. Fred S. Brinton of the firm of Lee and Brinton, well known Seattle naval architects, arrived in San Francisco on January 10. Mr. Brinton was on a short honeymoon trip, his duties in connection with the new Ames Shipbuilding and Dry Dock Company demanding his early return.

Mr. Bob Scott, for years with the Union Iron Works at San Francisco, later of Manila, and now of Tayport, Scotland, is now operating a munitions factory. He employs five men and seventy-five women, and states that the women make far superior machinists to the men.

Jim McKinley, for many years with the Union Iron Works, and later connected with the Marine Department of the Standard Oil Company, has accepted a responsible position with the Columbia River Shipbuilding Corporation of Portland, Oregon. This concern, of which Mr. Alfred Smith is the president, is to be congratulated on securing the services of Mr. McKinley, who has had many years of the best shipyard experience.

Mr. C. A. McMasters, formerly Secretary-Treasurer of the Alaska Steamship Company, resigned that position on the first of the present year to become connected with the new Washington Shipbuilding Corporation of Tacoma. Mr. McMasters' former position with the Alaska Steamship Company will be filled by Mr. R. G. Crouch, a veteran Seattle shipping man.

SPECIALIZING IN SCREW PROPELLER DESIGNS

When one considers the numerous different branches of engineering which enter into the construction of any modern type of vessel, it only seems plausible that one engineer or one staff of engineers, cannot style themselves as experts in regard to all of the aforementioned branches. It would, therefore, appear to be only rational that any company or individual designing a modern vessel should secure wherever possible the advice and assistance of experts who have made a lifelong study of one problem in marine engineering. For instance, it is rarely found that an individual who is an expert on steam turbines is also an authority on naval architecture, but let us take for granted that said individual is quite an authority on the two aforementioned subjects; is it not natural that he has mastered one of these subjects more completely than the other? Therefore, he would in all probability be widely recognized as an expert upon this one subject, rather than upon the other, which he has not mastered so completely.

Such is the case of the American Screw Propeller Company. They have made a specialty of the one element so important in marine engineering—"The Screw Propeller and Estimation of Power for Propulsion of Ships." They have mastered this subject completely; it is their daily occupation and study. Furthermore, they are fortunate in being able to number among their members the recognized authority upon this subject, but it was not until after 15 years of close study and experimenting that we were put in a position to be able to offer our services to the engineering world as the most modern authorities on the screw propeller.

The American Screw Propeller Company was formed just one year ago, at the suggestion of several of the most prominent marine engineers and naval architects in this country. Since its formation it has had the pleasure of including among its clients a majority of the large shipyards, as well as many prominent engineers and naval architects throughout the country. It may also be of interest to know that during its existence this company has designed propellers for approximately 150 vessels, a majority of which have been large steel passenger, cargo and tank ships, as well as many auxiliary schooners, tow boats, yachts and motor boats.

Taking all of the above into consideration, does it not seem reasonable that in this day of high efficiency and specialization the services of such a company should be secured for investigating the elements of ships and design of screw propellers.

MODERN GAUGING INSTRUMENTS WIDELY USED

The Pneumercator Company of New York reports that there has been a steadily increasing demand for Pneumercators both for Government and mercantile work. One of the latest orders received being for the new Matson Navigation Company's steamer "Maui," recently launched at the Union Iron Works, San Francisco. A total of 111 E-T-1 instruments have been ordered by the Navy Department for the newly authorized battleships. The Edward Luckenbach, fully described in the January Pacific Marine Review, is fitted with Pneumercators and the "Julia Luckenbach" has a special instrument installed for measuring the fuel oil in her bunker tanks.

The Pacific Mail trans-Pacific boats Venezuela and Colombia are also fitted with Pneumercators, the installation in the latter case now taking place. The new W. R. Grace and Company freighters are also to be fitted with these modern and accurate gauging instruments.

A highly interesting adaption of the pneumercator system has been installed for the U. S. Army Engineers Corps at Hell Gate in the East River for the purpose of measuring the rise and fall of the tide. This instrument is calibrated to give a reading for every foot, tenth of a foot and quarter of a tenth of a foot, and is apparently giving every satisfaction.

Another surprising use of the pneumercator is seen in the installation on the U. S. Dredge Manhattan, being operated by the U. S. Army Engineers in the Philadelphia district. In this installation the balance chamber of the pneumercator will be attached to the suction head of the dredge, the instrument recording on board the vessel the depth of channel which is being dug as the work goes on.

STANDARD GAS ENDS PROFITABLE YEAR

Mr. Geo. W. Emmons, president of the Standard Gas Engine Co., called his employees together on December 30th, and in a few brief remarks thanked them for the friendly spirit they had displayed during the year just passed, and hoped the same friendly feeling would be uppermost in their mind during the coming year:

"The success of our organiation is due to its solidarity and the harmonious feeling that prevails throughout the works, and I wish to impress upon you all that we must work together for a common end and with this object continually in your mind I feel satisfied that the year 1917 will be a 'hummer.'

"In view of the high cost of living, I have decided on presenting all of you who have been with the company for a period of six months or over a bonus, arranged on a sliding scale."

In all, close on to $2,000 was distributed among the one hundred and sixty employees.

CREOSOTED BLOCK CHOSEN

A highly interesting paving job recently announced was the contract let by the city of San Francisco for the repaving of Battery street, the material selected this time being creosoted wood block. About 1,000,000 blocks will be needed to complete the contract, there being about 20,000 square yards of surface to cover.

The material selected for this paving is Washington Douglas fir, treated with creosote oil at the plant of the Pacific Cresoting Company at Eagle Harbor, Washington, one of the largest wood treating plants in existence. While the blocks are sufficient to form a fair-sized cargo, there being 1,760 tons of them, they are being brought south in three vessels.

The city of San Francisco selected wood block pavement for Battery street because of this type of paving's enduring qualities under heavy traffic, and because of its noiselessness. Movements for the reduction of unnecessary noises are becoming more and more pronounced in American cities, as it is now recognized that noise exacts a heavy toll in nervous and bodily wear and tear.

NEW NEW YORK HOUSE

The Columbian Rope Company of Auburn, "The Cordage City," New York, has purchased the five story building at 31-33-35 Burling Slip as an office and warehouse for their New York branch. This company manufactures Columbian Rope and commercial twines.

For about twelve years the New York office has been located at 62 South Street. At the time this branch was first established, the quarters at 62 South Street appeared ample for many years to come. However, during the past few years the increase in business has indicated the need of larger quarters, so it is with unusual satisfaction that the Columbian Rope Company can announce to the trade the purchase of the larger and better quarters on Burling Slip.

The new building is to be remodeled to adapt it to the needs of the Rope Company and while the contemplated changes are rather extensive, it is expected that the building will be ready for occupancy in the early spring.

The floor space in the new building is nearly four times as great as that at 62 South street, so the change will mean far better service for their customers than ever before.

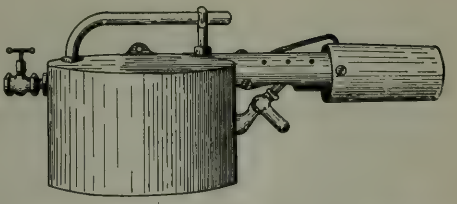
The increasing business of this branch is a reflection of the wisdom and foresight of Col. Edwin D. Metcalf, former president and founder of the Columbian Rope Company and no small measure of its success is due to the energy and ability of the organization which he built up at this branch. Mr. George B. Granger has been manager of this branch since its conception and Mr. D. M. Daley is assistant manager.

The Columbian Rope Co. also owns its own warehouse in Chicago of about the same size as the new New York building. It is located at 370 River street. Mr. W. V. Hawkins is manager of the Chicago branch.

The Boston branch is located at 131 Beverly Street, in charge of Mr. A. C. Clarke.

Mr. Joseph E. Sheedy, formerly General Superintendent of the Inter-Island Steam Navigation Company with headquarters at Honolulu, is now assistant to the President at the Seattle Construction and Dry Dock Company's plant.

Mr. J. C. Rohlfs, Manager of the Marine Department of the Standard Oil Company of California, left San Francisco on a business trip to New York on January 18.



The "Moore," a new all-around torch that has made splendid shop and foundry records.

A NEW TORCH

Recently J. W. Moore, a former employee of the Norfolk Navy Yard, produced and patented a torch which in the matters of simplicity of construction, lightness, portability and efficiency has much to commend it.

The Moore torch yields a flame that can be adjusted to any heat, from a soft light blaze that can be thrown on the face of the most delicate mold to a blaze that will melt cast iron in less than ten minutes; neither will it smoke or carbonize any surface, the combustion being perfect. In a test, a rough coat of loam one-half inch thick on a cylinder core 56 inches in diameter was dried to a firmness to the bricks in thirty minutes after being swept, with no danger in drawing the loam from the bricks or burning any spots with the use of kerosene.

Two of these torches were recently used on the navy collier "Jupiter" for taking off steel bands 20 inches wide by 4 feet diameter by 1½ inches thick on a twelve ton armature, the operations requiring less than 10 minutes each.

In the use of this torch, no preheating is necessary, yet a strong, clean, blue blaze of 2,200 degrees F. from 10 to 36 inches long will be produced 30 seconds after ignition. It will braze a 2-inch cup joint copper pipe, one-eighth inch thick, in 2 mintues and 10 seconds; will heat 3/8-inch steel plate red hot through in 3 minutes and 40 seconds, and will drip a rod of cast iron one-inch square in 9 minutes and 30 seconds by government test.

This torch has worked its way into the various departments of the Norfolk Navy Yard, and, owing to its portable nature, size, weight, small consumption of fuel, great heating qualities, simplicity of construction and safety, it has been adopted at this yard as a standard torch for all around work. There are now seventeen of them in use at Norfolk, one of which has been in constant service since January, 1915, without repairs of any nature.

These torches, which have proven their worth in machine shops, foundries, and on shipboard, are being handled on the West Coast by Mr. Melbourne Crisp, with offices at 24 California street, San Francisco.

WHITE BROTHERS' BULLETIN

All over the United States prosperity is now at high tide. The railroad earnings, which are always a good barometer, show enormous increases over last year. There is a car shortage at the present time due to the simple fact that there are not enough cars to carry the freight. The railroads, however, have given orders for the building of a large number of new cars.

The abundant crops have been sold at high prices and almost every line of manufacture is very prosperous. The voluntary wage increases and the bonuses to employees paid by numerous large manufacturing plants show the condition of business better than anything else, and the fine holiday trade of the retail stores all over the country shows the increased purchasing power of the people.

Mill stocks of hardwood are very much broken. The reports of "sold out" and "cannot supply" coming from all Eastern producing points show that dry hardwood lumber is liable to be very scarce this spring. Speaking particularly of conditions in the San Francisco market, stocks are quite large in most items, so that users of hardwood all over the Pacific Coast can obtain their supplies from this market with comparative ease for some time to come. If, however, the growing scarcity of dry stocks in the East is not overcome, the situation here will also become acute. It would seem to be a good idea for consumers to cover themselves on their hardwood requirements as soon as possible.

The stocks of Genezero on hand with San Francisco dealers are very large and the wood is in a first-class dry condition. Plain oak is being used very extensively, and the new Southern Pacific office building, one of the largest in the West, and the new Santa Fe edifice in San Francisco are both to be finished in this wood.

A significant fact in the hardwood trade is the very decided advance in the price of mahogany. Lack of ships to bring in the logs is the cause. Genezero, the companion wood of mahogany, has not advanced. Many people have always taken mahogany for granted and have not thought of other woods which, even though not similar in appearance, give an equally high-class tone and effect, and Genezero and other woods which produce a rich finish are certain to be used extensively this coming year.

Summing up the hardwood situation, the consumption is enormous; dry stocks are getting scarce, and for some time to come prices will certainly not be any lower than at present. If the muchly desired termination of the war is brought about in the near future, with the resulting European demand, there is no telling what will happen to stocks or to prices.

PNEUMERCATORS GAINING FAVOR

The Pneumercator Company report a healthy increase in the demand for their apparatus during the year just closed. The United States Navy is placing these instruments on many of the new ships such as the Battleship New Mexico, the torpedo boat destroyers Bridge and Henderson, the tanker Cuyama and the submarine L-10, etc. At the same time merchant shipping firms are steadily manifesting more and more interest in this accurate measuring device, the Pacific Mail Steamship Company having installations on their new Trans-Pacific boats the Colombia and Venezuela, W. R. Grace and Company on the Santa Paula and Santa Rosa, the Florida East Coast Railway on the big new sea-going car ferry Joseph R. Parrott and the Luckenbach Steamship Company on their latest big freighter, fully described elsewhere in this magazine, the Edward Luckenbach. The U. S. Suction Dredge Manhattan has a special pneumercator equipment installed, the first vessel of this type to be so fitted.

The Pneumercator Company recently undertook to market the apparatus of the Signal and Control Company and already have furnished Electric Automatic Whistle Controls for vessels building at Chas. Cory and Sons, the Collingwood Shipbuilding Company Ltd., the William Cramp and Sons Ship and Engine Building Works, the Seattle Construction and Dry Dock Company, the Great Lakes Engineering Works and the Union Iron Works Company.

The annual report of the United States Coast Guard for the fiscal year ending June 30, 1916, is now available for distribution, and contains a large amount of useful information giving a clear insight to the management of this important branch of the Treasury Department. A brief summary of the work for the year would be as follows:

Lives saved or persons rescued from peril	1,216
Persons on board vessels assisted	15,742
Persons in distress cared for	483
Vessels boarded and papers examined	30,510
Vessels seized or reported for violation of law	615
Fines and penalties incurred by vessels reported	$251,820
Regattas and marine parades patrolled, in accordance with law	36
Instances of lives saved and vessels assisted	1,453
Instances of miscellaneous assistance	2,021
Derelicts and obstructions to navigation removed or destroyed	30
Value of vessels assisted (including cargoes)	$10,509,655
Value of derelicts recovered and delivered to owners	$128,900
Appropriations for 1916, including repairs to cutters and stations	$5,418,641.06
Net expenditure for maintenance of the service including repairs to cutters and stations	$5,215,711.34
Estimated unexpended balance	$202,929.72

Every employe of the H. W. Johns-Manville Company who had been with the concern for one year or more received a Christmas greeting signed by President T. F. Manville, announcing that the Board of Directors had decided to give a bonus equal to 10 per cent of the year's salary. This action was prompted by the very satisfactory earnings of the Johns-Manville Company in 1916 and the splendid service rendered by the firm's employees.

By opening their new office at 911 Walnut Street in Des Moines, Iowa, January 1st, the H. W. Johns-Manville Company brought the total number of their branches up to fifty-five. Practically every important city in North America now has a Johns-Manville branch.

Mr. Wm. B. Roberts, who has been with this organization for a number of years, caring for the Iowa sales, has been appointed manager of the new office, and will have under him a corps of salesmen and construction men to make "Johns-Manville Service" a man-to-man service throughout that section of the country.

LEST WE FORGET

The Dreadnought Song

The songs of the sea are extremely interesting, but many of the older epics and sailors' "Chanties" are either lost or so warped away from their original cadence and words that the modern versions have preserved all the clumsiness of verse structure and none of the charm of expression. Recently, Mr. Jim Wyllie favored us with a version of the "Dreadnought" song as he remembered it, with the request that we publish same, and invite those with different versions to show him the errors of his memory.

The "Dreadnought" herself hardly needs any introduction. She was a medium clipper ship of 1,413 tons register, built by Currier and Townsend at Newburyport in 1853. She was owned by Governor E. D. Morgan, Francis B. Cutting, David Ogden and others of New York, who had her built specially for Captain Samuel Samuels, who, by the way, was the father of Mr. F. S. Samuels of the Oceanic Steamship Company of San Francisco.

That the builders of the "Dreadnought" were not mistaken in their choice of either the ship or her commander was amply proven by the regularity with which this flash "Red Cross Line" packet slipped to and fro across the North Atlantic with passengers, mail and freight. Although her best record of 13 days and 8 hours from Sandy Hook to the Northwest lightship, 3,018 miles, made in March, 1859, was by no means a record passage, yet this liner was possibly the best known ship that ever sailed the seas. She was wrecked and went to pieces on Cape Horn in 1869, Captain Mayhew and the crew being rescued after drifting for fourteen days in open boats.

For the greater part of the information above we are indebted to Clark's "Clipper Ship Era," and we append Mr. Wylie's version of one of the songs about this famous clipper in the belief that many will be interested and that some will want to make corrections or additions.

THE "DREADNOUGHT"

There's a saucy, flash packet, a packet of fame,
She belongs to New York and the "Dreadnought's" her name,
She is bound to the westward where wild winds do blow,
Bound away in the "Dreadnought" to the westward we go.

Oh the "Dreadnought" is lying in the Waterloo Dock
Where the boys and the girls to the pierheads do flock,
They give us three cheers as the tears down do flow,
Bound away in the "Dreadnought" to the westward we go.

Oh the time of her sailing is now drawing nigh,
Fare-ye-well, pretty maids, we must bid you good-bye,
For we're leaving old England and all those we hold dear,
Bound away in the "Dreadnought" to the westward we steer.

W. F. STONE

SHIP-BUILDER

Designer and Builder of
Wooden Commercial Vessels
of all Descriptions

Yachts and Pleasure Craft

Phone Fruitvale 430
Kennedy & Boehmer Streets
OAKLAND, CAL.

Now the "Dreadnought" is lying in the river Mersey
Waiting for the "Constitution" to tow her to sea,
For to round that black rock where the Mersey does flow,
Bound away in the "Dreadnought" to the westward we go.

Now the "Dreadnought" is bowling down the wild Irish shore
With the passengers all sick and the sailors all sore,
While the mates, like wild lions, walk the decks to and fro.
Bound away in the "Dreadnought" to the westward we go.

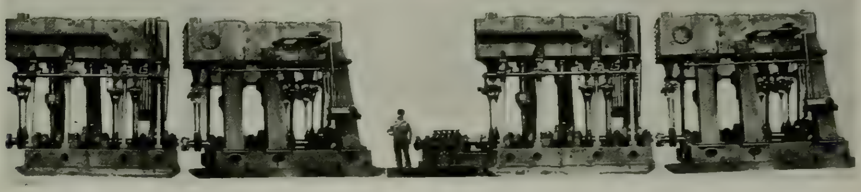
Now the "Dreadnought" is sailing o'er the Atlantic so wide,
And the dark, heavy billows roll along her black side;
With her sails neatly spread and the Red Cross to show
She's the Liverpool Packet, Good God, let 'er go.

Oh, now we are sailing o'er the banks of New-fun-land,
Where the water is green and the bottom is sand,
And among the grey cod-fish the whale fishes blow,
Bound away in the "Dreadnought" to the westward we go.

Oh, now we are sailing down the Long Island shore,
Where the pilot soon boards us as he's oft done before;
Fill away your main-top-s'l, board your main tacks also,
Bound away in the "Dreadnought" to the westward we go.

And now we are landed in New York once more,
We will drink to the "Dreadnought," she's the ship brought us o'er;
Talk about your flash packets, "Swallow-Tail" or "Black-Ball,"
But the "Dreadnought's" the clipper can beat one and all.

Then here's to the "Dreadnought" and all her brave crew,
A health to the captain, and officers, too,
Who sail this flash packet, wild ship of the sea,
And God bless the "Dreadnought" where'er she may be.
—Anon.



Four triple expansion engines built by the Seattle Machine Works to the order of the Pacific American Fisheries.

Among the Makers and Sellers

A BUSY MACHINE SHOP

Not only have our western shipyards been taxed to their fullest capacity during the year just past, but the engine and machinery building shops have also felt the keen demand for marine machinery. A great many of the newer yards that have sprung up during the past year have naturally a limited amount of shop facilities for machine work, and build practically hulls only, the engines, pumps, shafting and a large part of the outfit being let out on sub contracts. In the Northwest the amount of work thrown to the machine shops from shipyards has been very large.

The Seatttle Machine Works, one of the best known among the machinery builders of the Northwest, having been established for seventeen years, has been working to full capacity owing to the large amount of marine business taken care of during 1916 and the large orders now on hand for 1917 delivery.

The illustration herewith shows four 13-21-35 by 24-inch triple expansion engines built to the order of the Pacific American Fisheries for their wooden steam schooners now building at Bellingham. The shafting, propellers, stern bearings and stuffing boxes for these ships are also being made by the Seattle Machine Works. For the Skinner and Eddy Corporation, this concern is turning out the intermediate shafing, tail shafting, thrust shafts, bearing sleeves, propellers, bolts, stern bearings and stuffing boxes, stern tubes, steady bearings for the eleven 8800 ton d. w. carriers contracted for by that yard. For the Puget Sound Bridge and Dredging Company of Seattle, the Seattle Machine Works have the stern tubes and struts complete, propeller wheels, tail shafts and thrust sole plates for the two 250-foot auxiliary schooners now building to their order. For the Wallace Ship Yards, Ltd., of Vancouver, B. C., they are turning out crank shafting with forged steel crank webs, thrust shafting, line shafting, tail shafting, coupling bolts and nuts, etc., for hull No. 91.

NEW TREATISE ON GEARS

Despite the fact that gears of some sort are found in almost all machinery, it is safe to say that apart from the purely technical men very few gear-users have any real conception of the minute attention to detail involved in the making of even a passable gear.

In the matter of inspection alone, the jigs and gages employed represent a sum of money seemingly out of all proportion to the money value of the product, and com-

WHITE BROTHERS
HARDWOOD
LUMBER
FLOORING
VENEERS
PANELS
ETC., ETC.
FIFTH AND BRANNAN STS.
SAN FRANCISCO
INDIANA BENDING OAK - TEAK - ASH
WHITE CEDAR - IRON BARK - MAHOGANY
LONG OAK KEELS
EASTERN WHITE AND RED OAK, ETC.
WYBROLITE WATERPROOF VENEER PANELS
THE LARGEST STOCK OF HARDWOODS IN THE WEST

JOHNSON & HIGGINS

INSURANCE EXCHANGE BUILDING
SAN FRANCISCO

INSURANCE BROKERS AND AVERAGE ADJUSTERS

petent gear inspectors are not a drug on the market by any means, consequently their wages are a thing to be reckoned with.

Of course, to the man who regards a gear merely as a toothed wheel which turns another wheel, the refinements and requirements of gear-making processes will not be of any great interest, but to the man who insists that gears shall measure up to a certain efficiency standard, any authoritative information on the subject will be welcome indeed.

For the benefit of the latter class of gear buyers, the Van Dorn & Dutton Company of Cleveland, O., has issued a booklet with the succinct title, "Facts About Gears."

A few views showing the more important departments of the Van Dorn & Dutton plant and two pages giving suggestions as to the selection of materials for certain qualities, heat treatment and specifications are the only portions of the booklet which are not strictly technical.

The remaining pages are packed to the margins with valuable tabulated data on gearing terms, drawings and specification formulae for every type of gearing. Nothing is omitted which might be of value to the gear buyer in making up specifications covering his particular requirements.

The contents are divided into twenty-one sections, a perusal of which will enable even the non-technical gear user to figure out complete and accurate specifications for any system of gears.

The sections treat respectively with: Different Type of Gears, Facts About Gears, Gearing Terms, How To Order Gears of All Kinds, Spur Gear Specifications, Bevel and Mitre Gear Specifications, Worms and Worm Gears, Sprocket Specifications, Lewis' Rule for Strength of Gear Teeth, Diametral Pitch-Formulae, Diametral Pitch-Table, Circular Pitch-Formulae, Circular Pitch-Table, Decimal Equivalents of 113 Fractional Dimensions of One Inch, Decimal Equivalents of Fractions of Millimeters, Metric Pitch Module, Standard Keyways, Comparative Size of Gear Teeth, Weights of Round Steel, Weights of Metals, Circumferences and Areas of Circles from 1/64-inch to 100 inches.

As a digest of specialized gear data the booklet is worthy of a place in every gear user's reference library.

Interested persons may obtain copies from the Van Dorn & Dutton Company's general offices at Cleveland, Ohio.

NEW SHOP EXTENSION OPENED

On Saturday evening, November 18th, the Standard Gas Engine Company celebrated the opening of their new factory addition at their plant at East Oakland, California, by giving a good old-fashioned factory warming with modern trimmings, that will long remain in everybody's memory that attended the same.

The entire expense was borne by the Standard Gas Engine Company, who believe in good fellowship among their employees, and no limit was placed on the cost of the affair.

Some 250 invitations were sent out to the employees and their friends.

Mr. Geo. W. Emmons, President, and Mr. Wm. L. Hughson, Vice-President of the Company, were prime movers in this affair. Purchasing Agent Mr. Frank E. Baker, assisted by Mr. Peter Mohrdieck, Superintendent and Designer, took charge of the innumerable details that go towards making an affair of this kind a success, and that they succeeded far beyond their most sanguine hopes any one of the five hundred odd guests will willingly testify.

The affair was held in the new building itself, the floor of it being sanded and waxed, until it shone spotless and white. The white-washed walls of the building were covered with myriads of signal flags, palms and greens by the committee from the employees, under the direction of Mr. F. E. Baker.

A huge platform was erected at the west end, and from here a band of twenty pieces played sweet strains for those who cared to indulge in the art of terpsichore.

The grand march took place at 9:30 p. m., with some 150 couples in line. There were a couple of professional "fox-trotters" from one of the big, downtown cafes; a

Van Arsdale-Harris Lumber Company
FIFTH AND BRANNAN STREETS SAN FRANCISCO, CALIFORNIA

White Cedar, Spruce or Sugar Pine Template Lumber
Worked to Any Thickness Desired

Redwood Pattern Stock
In All Grades and Thicknesses

White Cedar
For Mould Loft Flooring

Long Clear Fir Timbers • Vertical Grain Fir Decking
Sugar Pine • California White Pine

number of pretty girls who sang. A recitation by Miss Gladys Emmons was favorably received. Speeches from President Emmons, Purchasing Agent F. E. Baker, Foreman Henry Bowers, and others.

And to round off a perfect evening, the galleries of the building were arranged with tables and chairs, and at 11 o'clock a repast was served to all those present

The dancing was in charge of Mr. Henry Bowers.

Among those present were: Mr. and Mrs. Geo. W. Emmons, Mr. and Mrs. W. L. Hughson, Mr. and Mrs. Peter Mohrdieck, Mr. and Mrs. C. C. Kriemler, Mr. and Mrs. F. E. Baker, Mr. and Mrs. J. Lorimer of the Atlas Gas Engine Company; Mr. R. Froboese, of the Standard Gas Engine Co.; Mr. A. Warrensjold, of the Atlas Gas Engine Co.; Mr. M. Wright, of the Atlas Gas Engine Co.

MECHANICAL EQUIPMENT FOR SHIPS

Mr. A. McNab, vice-president of the McNab Company, Bridgeport, has recently returned from Europe, where he obtained the sole agency for the United States of Messrs. Brown Bros. and Co., Ltd., of Edinburgh, Scotland, manufacturers of the Brown telemotor; Messrs. J. Stone & Co., Ltd., of Deptford, London, manufacturers of Stone-Lloyd hydraulically operated bulk-head doors, hydraulic underline ash expellers, bronze propellers, hydro extractors, ship windows, side lights, etc.; Messrs. B. R. Vickers Engineering Co., Ltd., of Leeds, England, manufacturers of Vickers' patent tail shaft lubricating appliances; and of Chadburn's (Ship) Telegraph Co., Ltd., of Liverpool, England, manufacturers of Chadburn's ship telegraph and other instruments.

All of the above appliances, the exclusive American agency for which Mr. McNab has secured, are in use by the principal navies of the world as well as by practically all the leading steamship companies, and comprise lines of steamship equipment too well known in marine circles to require introduction or endorsement. In this connection, however, an interesting article descriptive in detail of Vickers' patent tail shaft lubricating appliance appears in the January number of International Marine Engineering, which may be noted as instructive and most important in the safety-first principle of ship operation.

Throughout this year (1916) the McNab Company reports having done not only a record business, representing the most prosperous year of its history, but a business of constantly expanding proportions. During the first three months—January, February and March—the extent of its marine equipment sold, consisting of the McNab Direction Indicator, the Willett Bruce Steamship Whistle Control, and the Cascade Boiler Circulator, equalled the total sales of any previous twelve consecutive months since the incorporation of the company in 1910, and during the first six months of 1916 the company's business equalled in extent that of any previous two years combined.

Captain John Bulger is in Washington, D. C., attending the conference of Supervising Inspectors.

"European countries have forbidden the transfer of ships to other nations. Norway forbids the buying of old vessels and forbids sales to other countries. They must buy new. Norway taxes ships 46 per cent of their net earnings. Norway has 8000 vessels of all kinds of 2,000,000 tons."

Work is progressing steadily on the new seaport of Hondagua, on the east coast of the island of Luzon. This port is nearly 1,000 miles nearer to America than Manila, to which it is being connected by a railroad across the island. The new port is a highly important one, both from a commercial and an naval standpoint.

"For Speed"

Germicide Composition

AMERICAN MARINE PAINT CO.

149 CALIFORNIA STREET
San Francisco

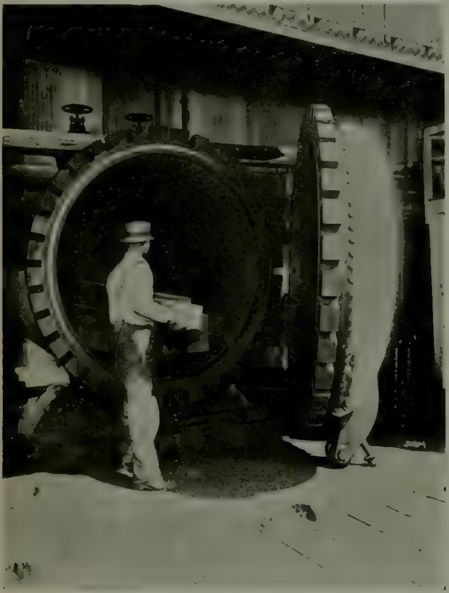
8 Bridge Street, New York
67 Columbia Street, Seattle

HOME OFFICE—SAN FRANCISCO

Agencies in All the Principal Ports of the World

Making Wood Defy Time and Weather

THE MODERN WAY—CREOSOTING



Testing Retort at Eagle Harbor

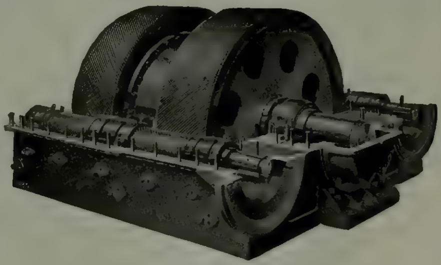
As an annex to one of the largest commercial creosoting plants in the world at Eagle Harbor, opposite Seattle, we maintain a complete experimental plant that throws light on knotty problems of creosoting and enables us to keep just a little ahead of general progress in creosoting processes.

That is one reason why Pacific Creosoted Products—Piling, Structural and Bridge Timbers, Creosoted Wood Block and Wood Forms of all kinds are of superior excellence.

J. H. BAXTER & COMPANY
California Agents
Merchants Exchange Building - San Francisco

Pacific Creosoting Co.
NORTHERN LIFE BUILDING
SEATTLE, U. S. A.

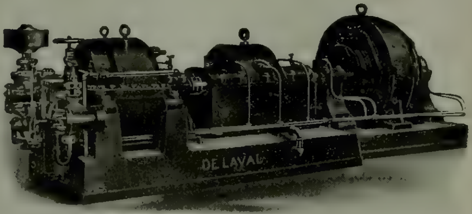
DE LAVAL
Geared Turbines



4500 H. P. De Laval Marine Reduction Gear

FOR PROPELLER DRIVE---

Save engine and boiler-room space.
Save 10 to 15% of fuel.
Save larger part of cost of supplies and maintenance.
Save first cost.



De Laval 300 K. W. Multi-stage Geared Turbine Driving D. C. Generator; built for U. S. S. "Arizona"

FOR AUXILIARIES---

Save weight
Save large part of supplies and maintenance.
Keep oil out of boilers
Save on first cost.

De Laval apparatus is distinguished by moderate peripheral speeds, large running clearances, horizontally-split casings, **interchangeability of parts (due to manufacture on the limit gauge basis throughout), and the fact that each machine is guaranteed as to efficiency and is fully tested at the builder's works.**

State character of vessel, steam pressure and horse power and full data will be sent. Ask for publication O. 57.

De Laval Steam Turbine Co.
TRENTON, N. J.

PACIFIC MARINE REVIEW

THE "JOHN ENA," OUTSIDE THE GOLDEN GATE, SAN FRANCISCO

MARCH 1917

WELIN EQUIPMENT on the S. S. Maui

AT FITTING-OUT DOCK.
S.S. "Maui," new 17,000-ton passenger ship of Matson Navigation Co., fitted throughout with Welin Equipment.

This new and palatial liner, which is just being finished at the Union Iron Works, is equipped with

Welin Davits & Life Boats

We have a little Reason Why Copy explaining our equipment.
Are you interested?

Boat Deck of the Matson S. S. Co.'s S.S. "Matsonia," Showing Full Equipment of Welin Davits, Steel Keel, Lifeboats, Etc.

WELIN MARINE EQUIPMENT CO.

305 VERNON AVENUE
Long Island City New York

FRANK WALKER,
Seattle, Washington

FORD & GEIRRINE,
San Francisco

The entire Passenger Fleet of the Matson Navigation Company is being equipped with Welin Davits

PACIFIC MARINE REVIEW
The National Magazine of Shipping

VOL. XIV, No. 3 SAN FRANCISCO MARCH, 1917

Oil For Our Navy

IN the November nineteen-sixteen issue of the "American Review of Reviews" appeared an article under the caption, "Our New Navy," from which the following sentences are extracted:

> "Within the lifetime of this generation oil will be scarce. Where then is the new navy of defense to get its fuel? In answer to that question enters the curse of an efficient navy—politics. The Government has segregated in Southern California oil-field sufficient to supply the Navy's needs. These are Federal lands. But railroads also use oil. And the big motor companies covet oil; and promoters and squatters and swindlers also have their eyes on those oil fields. It does not lessen the danger to the Navy in the least that there is an underground pipe line running from the promoters and squatters and swindlers up to Senators and Congressmen."

The presumption that anyone who undertakes to develop a new industry in the United States, or open a new field for an existing industry, is either a promoter, a squatter or a swindler was very prevalent in the "muckraking" days of several years ago and the idea seems to be dying hard. Such a malicious string of falsehoods as that quoted above is utterly unworthy of being dignified by an answer, but the wide circulation of the American Review of Reviews throughout sections of our country where the controversy anent the California oil lands withdrawal is little understood makes it imperative that the article quoted be answered and that the readers of the American Review of Reviews be told just who these "promoters and squatters and swindlers" are and just what they are contending for.

Putting aside, for the present, the hazy technicality under which the Government claims the right to deprive the workers of certain oil lands of the result of their effort and investment, let us examine first the necessity for an oil reserve for the use of the Navy and what is available for this purpose.

Oil for Navy Fuel

The use of oil as fuel for naval purposes is comparatively new. It possesses so many unquestioned advantages that foreign navies as well as our own have taken kindly to its use even where their available oil supply is by no means cheap or plentiful. Oil lends itself to storage in out of the way nooks and crannies, in the peaks, in double bottoms and in many spaces on board a war vessel that would otherwise be wasted space or else used for water ballast. Again, oil in the double bottoms of a war ship has the effect of minimizing the damage resulting from torpedo explosions. These and many other reasons render it altogther plausible that oil will soon be practically the only fuel used in the vessels of our new navy. Under these circumstances no one will question for one moment the wisdom and necessity of the Navy Department bending every effort to secure an adequate and serviceable source of reserve fuel oil supply. Certainly no California oil operator has ever been heard raising his voice against the proper safeguarding of the nation's interests or voicing the sentiments of a "little" American. While granting the wisdom and necessity of setting apart an oil supply for our navy, the California oil operator is rightfully unwilling to submit to uncompensated confiscation of property and that the accomplishment of the government oil land suits will constitute confiscation is a fact which we will endeavor to make clear in this article.

The Three Reserves

Three oil land reserves for the use of the navy have been created. Number one is in California and contains 38,070 acres; number two is also in California and embraces 30,080 acres while the third is in Wyoming and is 9,481 acres in extent.

If we omit reserve number two, we find that numbers one and three constitute a reliable source of fuel for the Navy for a good many years to come. The reason for omitting reserve number two is that it is in that reserve where nearly all of the controversies center and where practically all the injustice will be done to operators unless the Government decides to act in the interest of common equity and property rights. The United States Geological Survey experts credit Naval reserve number one with 100,000,000 barrels and Naval reserve number 3 with 30,000,000 barrels of oil. Now Secretary of the Navy Daniels, in a letter dated February 17, 1916, and presented in the hearing of the Naval Committee of the House of Representatives, stated that the use of oil for the Navy for 1916 would amount to 600,000 barrels and he estimated that, with the large increases in the fleet provided for, that in the event of war the consumption would be about 5,000,000 barrels per annum. If we allow two million barrels in time of peace and five million barrels per annum as a liberal estimate of the Navy's needs during war, we find that these two Reserves alone would supply the Navy for sixty-five years of peace or keep our ships in fuel through nearly twenty-two years of continuous warfare.

It will be seen that the Navy can secure quite a liberal future supply of fuel oil without resorting to the questionable seizure of lands in the Midway Field (Reserve Number Two), but these specified Naval Reserves are not the only source of supply. In Colorado 45,000 acres of shale lands were recently withdrawn by the Government and in Utah 86,000 acres were similarly set aside. The estimated production from these reserves is 100,000,000,000 barrels, enough surely to serve the Navy to the dawn of the Millenium. The total acreage of outstanding petroleum reserves is 5,603,295 and of this vast domain, 3,083,000 acres are estimated to be vested in Government ownership.

The European war has clearly demonstrated that in a struggle of any consequence that the governments of belligerent nations must assume absolute control of all supplies necessary for the proper and thorough conduct of modern warfare, therefore it is the supply of our Navy in times of peace that concerns us more than its fuel oil reserves during war. No one doubts for a moment that should the occasion ever arise that the Government would commandeer the entire fuel oil supply of the country. The problem before the Navy Department is to secure an oil supply that is permanent or semi-permanent in character and which can readily and safely be transported to the various naval bases frequented by the warships which are to use it. Does the reserve which the Government is attempting to create in the Midway Field meet these requirements? We think not.

A Reserve That Would Dwindle

In Naval Reserve No. 2 there is 30,080 acres of which 18,880 acres are patented and are producing in round numbers 33,000 barrels of oil per day or at the rate of 12,000,000 barrels per annum. The unpatented area of 11,200 acres is producing 14,000 barrels per day or at the rate of 5,110,000 barrels per annum. Of the unpatented area only 7,040 acres is proven territory. Unlike coal, oil is a liquid and will flow to any point where the pressure is reduced, in short should the Government elect to allow the unpatented territory which it seeks to secure to remain idle, the wells on the patented territory would rapidly diminish the supply. If, on the other hand, the Government gains possession of the unpatented lands in this oil reserve and works same to its full capacity, it will be faced with the problem of either selling its surplus oil or providing for enormous storage. Finally, if the Government removes oil from this field only as it is actually needed by the Navy, and this of course would be the natural course to follow with a reserve supply, the adjoining patented properties would eventually destroy the productivity of the unpatented lands.

In short, should the Government succeed in ousting the individuals and corporations who are working their holdings on unpatented lands, the result would only be the acquisition of an extremely doubtful reserve supply of oil. Excluding Naval Reserve No. 2, which contains, as shown above, many private ownerships and is now the subject of controversy, the Government has entirely for naval use 178,551 acres with an estimated yield of 100,130,000,000 barrels of oil. Is it necessary then that a great nation stoop to unjust methods to obtain control of 7,040 acres of proven territory?

The Government's Case

On September 27, 1909, Mr. Taft, then President of the United States, withdrew without notice several million acres of oil lands in the Western part of the country. Claims had been initiated on portions of these lands by a great many people. The validity of the withdrawal order was disputed by many, even Mr. Taft, himself a lawyer of unquestioned ability, doubted its legality and, acting upon the advice of eminent counsel, the oil operators in Naval Reserve Number 2 proceeded with development work expending many millions of dollars.

On June 25, 1910, Congress passed the Pickett Act authorizing the President to make the withdrawals of oil lands and provided that only active work and continued diligence would protect the granting of the withdrawn land. This statute is now construed by the courts to be retroactive. In other words an act is passed in June, 1910, making it imperative that certain actual work must have been performed prior to September, 1909. More than two years later, in 1912, two enormous withdrawals of land for use as naval fuel oil reserves were made in California. Prior to these withdrawals, the oil lands within these reserves had been developed and worked with the full knowledge and apparent approval of the Government.

It was not until the early part of 1915 that the validity of the Taft withdrawal order of 1909 was finally determined and then only by a divided vote of the Supreme Court. Four Federal Judges had meanwhile declared the withdrawal invalid so that, under the Act of 1912, oil operators were not only justified in proceeding with their development work, but were bound to do so in order to comply with the Act of 1910, which made mandatory "continued work and diligence."

The attitude of the Government in its oil land cases implies that the honesty of the operators has been called into question. In this connection we quote the following from a recent decision handed down by United States Federal Judge Bean:

> "The operators were advised that the executive was without authority to suspend the acts of Congress and withdraw the land from the operators and if they discovered oil they had acquired a right to the property and by acting on this advice honestly and in good faith without the least intention of wronging the Government they developed and spent large sums of money in so doing, by their labor and expenditure they developed the mineral character of the lands and increased their market value from two or three dollars per acre to two or three thousand dollars per acre."

The opinion of Judge Bean as to the moral side of these oil land cases is more than supported in the decision handed down by Federal Judge Bledsoe in the McCutchen case. From this document we glean the following:

> "There can be no valid claim, in my judgment, that the defendants herein were in any sense wilful trespassers. Assuredly there is nothing in the facts developed to warrant that conclusion, and I know of no rule of law which could or should appeal to this court in equity which would have the effect of adjudging them. True it is, as I have been constrained to hold, that without warrant they entered upon the lands of the United States and extracted mineral content therefrom. True it was, however, also, that they did this in what I conceive to be in good faith and acting under the advice of counsel. There can be no doubt that bad advice emenating from reputable counsel will not suffice to confer any rights where otherwise none would exist. But there can be no doubt either that in a court of equity at least, the imputation of being wilful trespassers will not be indulged in as against those who are shown to have acted in good faith in reliance upon advice of reputable counsel."
>
> "At the time the transactions complained of were had in this case, the validity of the withdrawal order of September, 1909, had not only been upheld, but on the contrary had been determined by courts of great respectability, to be without force or effect. The President of the United States, himself a great lawyer, had indicated his doubt as to his power to make the order, and there is small wonder, therefore, that counsel, eminent in their profession, should after mature deliberation, have been led to advise clients that the order, being beyond the scope of executive function, might be disregarded."

If sufficient evidence of the good faith of the operators and the injustice of the Government prosecutions cannot be found in the Federal Court decisions quoted and others that have been handed down in these oil cases, we can find equally strong testimony from the Administration itself. Franklin K. Lane, Secretary of the Interior, and it is to this Department that the matter of handling the public domain is entrusted, in a published statement says:

> "I hope that Congress will give consideration to this situation. These are lands withdrawn by President Taft in September, 1909, after part of them had been filed upon and some development begun. There was doubt at the time of the withdrawal as to its legality, there being no specific statute on the books authorizing the action. Congress at its next session passed an act authorizing such withdrawal, and the same lands were subsequently withdrawn again in July, 1910."
>
> "It was the opinion of many of the members of the bar that the withdrawal of 1909 was void, and the operators proceeded to act in accordance with this advice. The result was that when the second withdrawal was made in 1910, there was a large number of operators engaged in drilling. The Government insisted upon the 1909 withdrawal, and by a decision rendered last spring in the Supreme Court sustained the Government's contention, so that today those who were not engaged in the actual development of the lands at the time of the first withdrawal have no legal title."
>
> "If the full measure of the Government's right is acted upon as a basis of our policy in dealing with these lands, it will bankrupt many oil companies, and do what appears to me an injustice, and an unnecessary injustice, to those who have invested many millions of dollars under a mistake as to the law."
>
> "I feel that this is one of those situations often arising in the life of the individual and of the State when it is not wise to exact all that the law allows, even as to those who are in the wrong."

It may be contended with considerable show of reason that the oil operators should have scrupulously followed such a course as would have been theirs had they fully believed in the legality and so been advised concerning the Taft withdrawal order of 1909. In this connection, however, it must be remembered that minerals located in the public domain had been free for over fifty years and that during all this period the Government had encouraged discovery and development work. The Taft withdrawal order was so utterly at variance with the former government policy relative to shale lands and the legal fraternity was so unanimous in its opinion that the withdrawal was invalid, that little wonder need be expressed over the action of oil operators and prospectors. Not only did they believe that they were "safe" in proceedng with their plans of developments, but also that they were strictly within their legal rights.

Under the circumstances as they exist in the so-called Naval Reserve Number Two today, it is hard to understand the attitude of Mr. Daniels, our present Secretary of the Navy. Mr. Daniels has persistently opposed any compromise measure that would see justice done to those operators in the Midway Field who have worked their holdings in good faith and without the slightest intention of wronging the Government. He seeks to force the issue on lands which possess a great value as far as present oil production is concerned but which have little vaue as a reservoir of "reserve" supply. With proven land set aside for our Navy's use sufficient for many years to come, with other shale lands reserved whose contents will fully satisfy our naval needs for centuries—and all this, mind you, secured without hardship or injustice towards anyone—Mr. Daniels insists that a policy be carried out to the bitter end relative to some seven thousand acres in the Midway Field and the "bitter end" means the bankruptcy of many small independent oil companies and operators in return for an empty legal victory, for while the Government is pressing suits and making plans to some day work the property or formulating a scheme under which it will be leased to operators, the workers of adjoining territory, who cannot be ousted, will slowly be transforming Naval Reserve Number Two into an exhausted oil field.

But a far higher issue than the securing of a doubtful reserve oil supply for naval use, a higher issue even than the bankrupting of a large number of small oil operators is at stake. These oil cases have a moral as well as a legal aspect. The legal contention of the Government is obviously weak as a minority of the Supreme Court could not subscribe to it. On the other hand the moral contention of the oil operators is exceedingly strong, in fact has been dwelt very forcibly upon by everv Federal Judge before whom one of these Government oil cases has been tried.

No government can afford to place legality on a higher plane than morality when prosecuting cases against its own citizens. If it is good law that ignorance of legal tenents or acquiescence to the advice of eminent counsel do not constitute paliating circumstances, it is equally good morals that the man who unwittingly commits a blunder should not be prosecuted. When the Government of the United States admitting the absence of wrong-doing and thus placing itself morally in the wrong though legally in the right, continues to prosecute cases the success of which brings no return that can even partially compensate for the loss of moral stamnia involved, then indeed we feel fully justified in protesting even in the face of a Supreme Court decision.

In the face of national necessity, some of the nations of the old world have confiscated entire industries, but in every case have they paid for what they have seized and paid a fair price. Can our country allow prosecution to deteriorate into persecution and acquisition into confiscation? Surely seven thousand acres of reserve oil supply is worth no such moral sacrifice.

There is still another aspect of these oil land cases, however, and that is their effect upon the consumer. Here in the West where the oil lands controversy is pretty thoroughly understood, the public stands on the side of the operators. Governor Johnson of California, lately elected to the United States Senate and whose entire political history has been one of contention against what is generally termed "special interests," is a conspicuous example in the long list of judges, state officials and men of prominence who have expressed themselves as strongly opposed to the Federal Government taking advantage of the opportunity afforded it by a legal technicality.

No political influence could command the almost universal disapproval of these oil cases that has been manifested in the Pacific Coast States. The sentiment is one that has been aroused through the conviction that these cases are responsible both directly and indirectly for the steady increase in the price of crude oil that has marked the West Coast market during the past twelve months.

The price of oil, like that of any other commodity, is governed by the visible supply and the oil companies have been compelled to draw upon their surplus stocks. As long as new development work was going on, as long as new sections were being opened up and new wells being "brought in," the surplus oil stocks on hand could be held fairly stationary and increased production took care of increased demand, the price of oil to the public remaining stationary for months and even years at a time. This has all been changed, however. Promotion work has ceased, prospecting new fields is no longer attractive and a condition of paralysis exists in that very portion of the oil business that might have been counted upon to preserve an increase in the supply that would have successfully met the increased demand.

The citizen of the Pacific Coast has as keen an appreciation of the navy's needs as any citizen of the United States, he fully realizes that our navy and our navy alone stands between him and foreign agression, but he does not wish to pay forty per cent more for his fuel oil in order that his navy may acquire a doubtful, unnecessary and superfluous oil reserve. Furthermore he is inclined to place the moral above the legal aspects of these oil cases and to voice his protest at action which, in his opinion, has degenerated into the atmosphere of Might being Right.

"Promoters and Squatters and Swindlers"

Who then are these "promoters and squatters and swindlers" mentioned in the article on "Our New Navy" appearing in the American Review of Reviews? Can these be the men who entered the desert under the lure of the search for the unknown? The men who pioneered a country where water was unknown, where every bit of machinery, food and supplies had to be transported over arid wastes where no railroad existed, who staked their all under the belief that if successful their government would protect their interest, these perhaps are the "promoters." The men and companies, and there were many of them, who spent every cent they could raise in sinking expensive wells that proved to be dry holes and finally, broken by the implacable spirit of the desert, gave up in despair, these are the "swindlers" and there can be no doubt that the term "squatters" is meant for the men who won out in their bitter fight with nature, found oil, laid the foundation for cities and towns and transformed a useless, barren wilderness into a wealth producing and livable section of our Commonwealth. These men ask that what is morally, nay legally, theirs be not taken away from them without compensation. Why should such a request call forth an article such as appeared in The American Review of Reviews? Is the development of an arid and unprofitable waste into a productive area the benefits of which have been and are still being felt from one end of the Pacific Coast to the other, worthy of no greater return than scorn, derision and injustice towards those who have brought it about?

The "Ryder Hanify" taking the water. This craft has some interesting features, among which is the placing of the boilers on the main deck instead of the hold.

THE "RYDER HANIFY"

The steamer "Ryder Hanify," designed and built by W. F. Stone, of Oakland, California, was successfully launched on January 22. Considerable interest centered in the launching owing to the fact that the ship, having a length of 235 feet, was launched at right angles into a channel much less than twice her length in width. Heavy anchors and chains were placed at the ends of the ways and carefully measured hawsers made fast to the vessel. These hawsers tightened and began to surge as soon as the ship left the ways, and in this way the hull was brought to a stand before reaching the opposite shore.

The "Ryder Hanify," which was built to the order of J. R. Hanify and Company of San Francisco, is 235 feet over all, 43 feet beam and 17 feet depth of hold, and is designed to carry 1,500,000 feet of lumber. She will be driven by a 1,000 h. p. triple expansion engine built by the Main Street Iron Works of San Francisco and steam will be supplied by two B. & W. boilers.

The vessel is being rigged with three masts and three sets of powerful gear for working her three hatches. An unusual feature of the "Ryder Hanify" is the placing of her boilers on the main deck, thus allowing considerably more cargo space in her hold and making the vessel more practical for general freighting if her owners ever decide to use her for anything but lumber carrying.

The "Ryder Hanify" will be commanded by Captain Frank B. Zaddart, an old time Pacific Coast skipper, and after her trial runs, which will take place during the present month, she will be put in the lumber carrying trade.

The "Ryder Hanify" on the ways ready for launching at the W. F. Stone shipyard, Oakland, California.

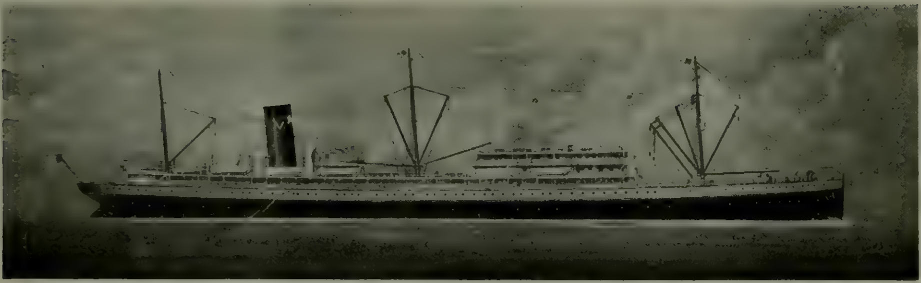
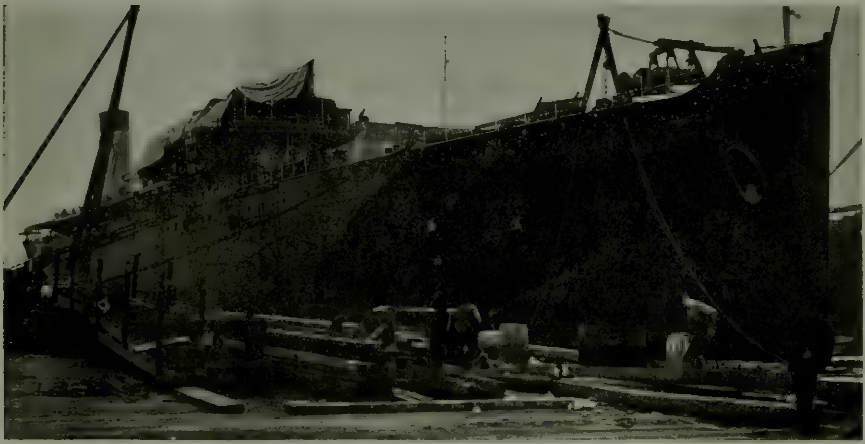
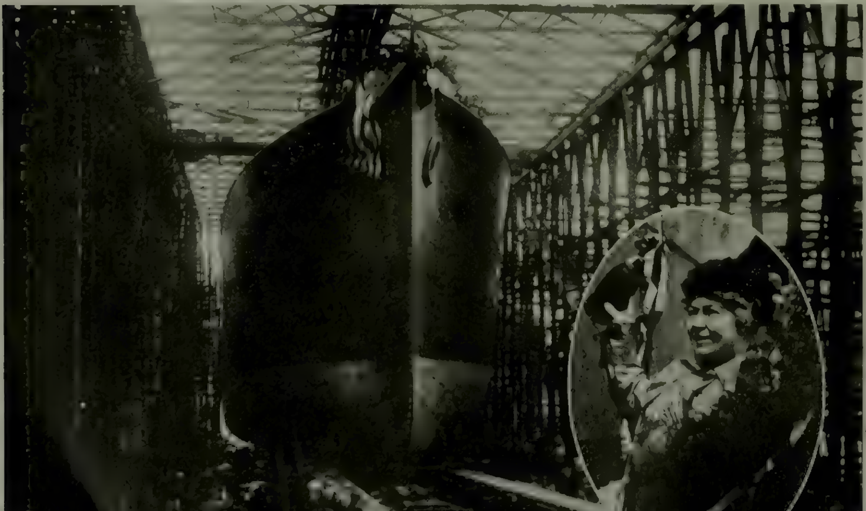


Fig 1. The Steamship "Maui" as she will appear in service.



View of the "Maui" at the fitting out wharf of the Union Iron Works Company. This picture was taken about February 15.



The launch of the steamer "Maui." The insert is of Mrs. Wm. Matson, wife of the president of the Matson Navigation Company, who christened the big vessel.

Description of Geared Turbine Machinery for S. S. "Maui"*

By W. W. SMITH

THE S. S. "Maui," which is nearing completion at the Union Iron Works, San Francisco, for the Matson Navigation Company, is of especial interest because she is the first large passenger vessel in this country to be equipped with geared turbine machinery. Most of the vessels which have been equipped with geared turbines have been single screw and of comparatively small power—from 2,000 to 3,000 h. p., whereas this installaion is twin screw and will develop 10,000 h. p. at full speed.

The "Maui" will be used for passenger and freight service between San Francisco and the Hawaiian Islands, the scheduled run being 5.8 days (distance 2,080 miles). The outbound cargo will be general, and the return cargo sugar, fruit, etc. Extensive passenger accommodations of the first class are provided as shown in Fig. 2. The dimensions of the ship are as follows:

Length, overall	501 ft.
Beam, moulded	58 ft.
Draft, load	29 ft. 11 in.

Boilers and Auxiliary Machinery

Steam is supplied by eight Babcock and Wilcox marine type water tube boilers, which are fitted with superheaters and equipped for burning fuel oil, the pressure at the boilers being 265 pounds and the superheat 50 deg. Fah. The fuel oil system will be of the mechanical atomizing type. The boilers have a heating surface of 30,100 sq. ft. and a superheating surface of 3,520 sq. ft.

The evaporating plant is of the Reilly type and has a capacity of 25 tons per day. The refrigerating plant is composed of three 10-ton Brunswick ammonia refrigerating machines. The electric plant contains two 30 k. w. and one 50 k. w. generators, which supply direct current at 110 volts. The anchor engine is of the Hyde, and the steering gear Brown type. There are nine steam cargo winches, and the usual equipment of pumps and small auxiliaries.

Propelling Machinery

The propelling machinery is located in the stern, and consists of cross-compound geared turbines driving out-turning twin propellers. The propelling machinery and condenser auxiliaries will be supplied by the Westinghouse Machine Company, East Pittsburgh, Pa., and were completed about January 1, 1917.

Each main unit is composed of a high and a low pressure turbine and a double pinion reduction ge

The propelling machinery is designed to develop 10,000 s. h. p. and to give a speed of 16½ knots, the performance data being as follows:

Condtion	Light	Loaded
Speed knots	16½	16½
R. P. M.—Propeller	125	129.5
R. P. M.—Turbine	1,995	2,070
S. H. P.—Ahead	8,500*	10,000
S. H. P.—Astern	5.100*	6,000

*Reduced boiler power.

The astern turbines will develop 60 per cent of the ahead power with the same flow of steam.

The operating conditions at the turbines are:

Steam pressure	225 lbs. gauge
Superheat	50 deg. Fah.
Vacuum	28½ in. of merc. referred to 30 in. barometer

The machinery weights are as follows:

Turbines, cross-connecting piping and valves	57.5 tons
Reduction gears and thrust bearings	78.0 tons
Condenser auxiliaries	10.82 tons
Total	146.32 tons
Total per s. h. p.	32.8 pounds

Turbines

The turbines are of the Westinghouse impulse-reaction cross-compound type, as illustrated in Figs. 4 to 7. At full power the turbines are designed to develop 2,500 h. p. each, or a total of 5,000 h. p. for each unit at a speed of 1,995 r. p. m.

The ahead high pressure turbine is composed of a two row impulse wheel followed by reaction blading on a drum.

The ahead low pressure turbine is of the reaction type.

The astern high pressure and low pressure turbines are two row impulse wheels. In both ahead and astern turbines the steam passes successively through the high and low pressure turbines. The turbine cylinders are made of cast iron, except the ahead end of the high pressure turbine, which is of cast steel, and are divided on a horizontal plane.

The shafts and rotors are made of cast steel. The impulse wheels are formed integral with the shafts, and the parts of the rotor are bolted together on a large diameter.

The ahead nozzle chamber is divided into three compartments, two of which are provided with hand operated valves for closing off part of the

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*A description of the Westinghouse geared turbine machinery for the tank steamer "Malmanger" appeared in "Marine Engineering," August, 1916.

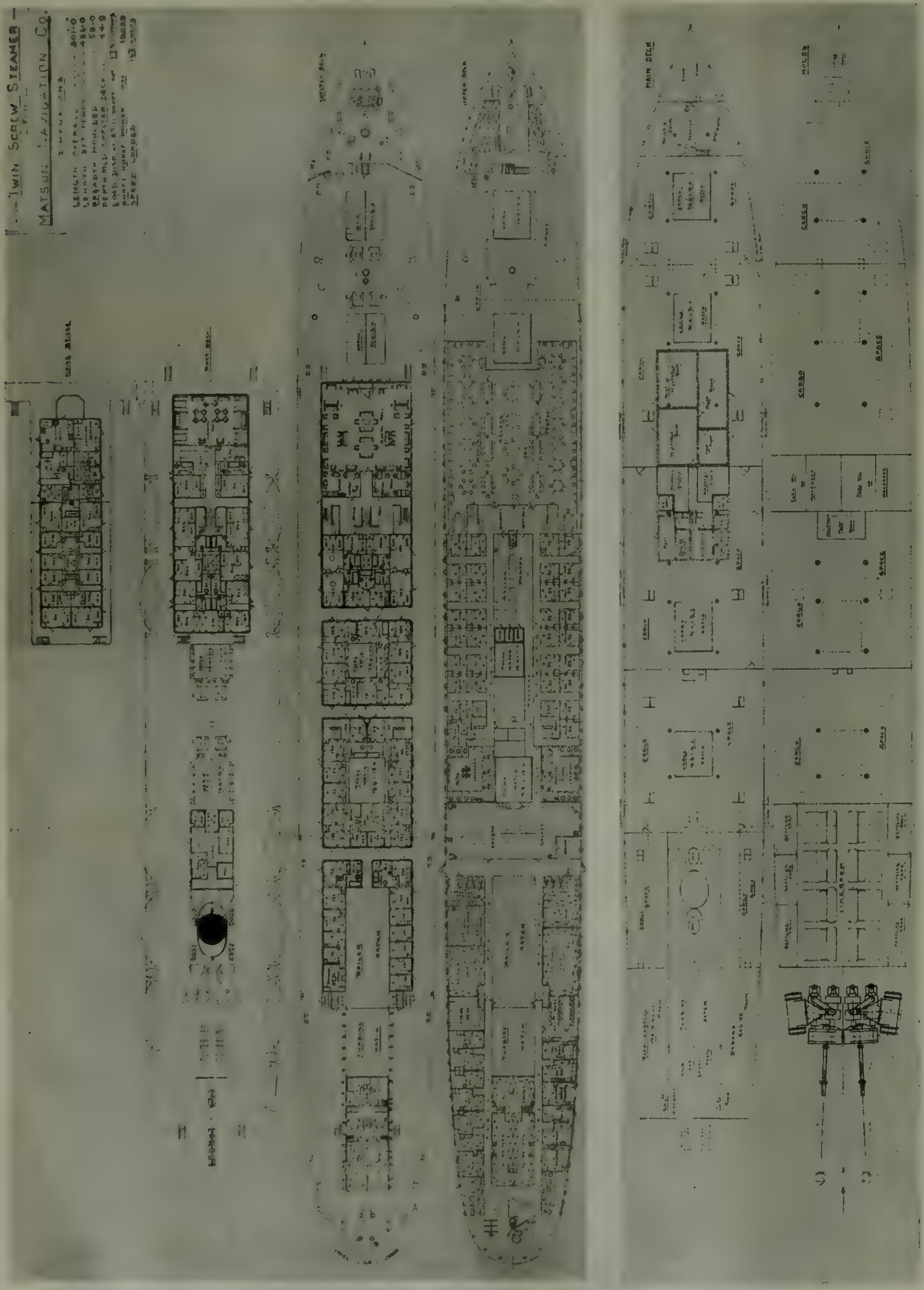


Fig. 2. Deck plans showing geared turbines and boilers.

nozzles at reduced power. With this arrangement of group control, all, five-sixths, or three-fourths of the nozzles can be in operation as required. The astern nozzles are not arranged for group control, because economy at reduced astern power is of little importance.

The impulse blades are made of machined nickel steel. They are secured in the rotor by a tongue and groove construction, and are additionally secured against vibration by tight wedges.

The reaction blades are made of drawn phosphor bronze and are secured into dovetail grooves by a positive mechanical interlock between blades, packing pieces and grooves.

Balance pistons are located at the inlet ends of the ahead high pressure and low pressure turbines to balance partially the steam thrust on the drums. Balance pipes connect the spaces behind the dummies with the exhaust from corresponding reaction blading.

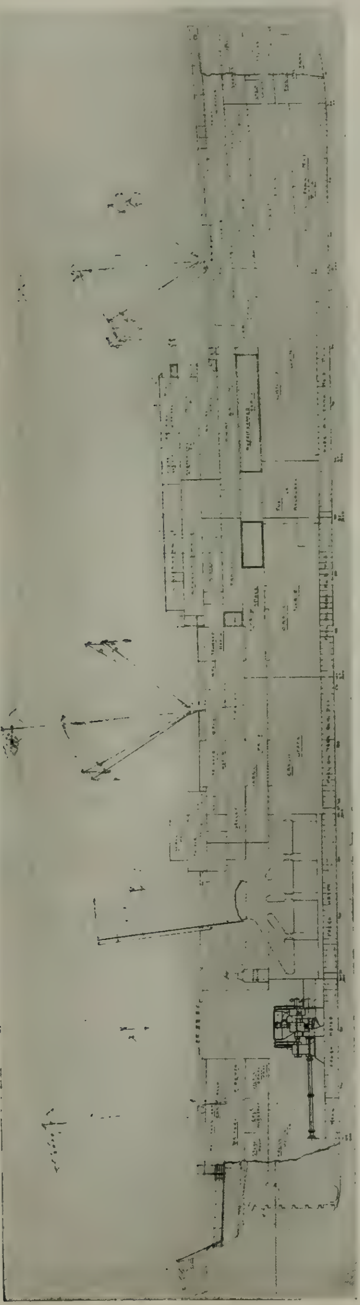


Fig. 2A. Inboard profile illustrating location of geared turbine machinery and boilers.

A packing of the radial labyrinth type is located between the high pressure ahead and astern turbines.

The glands are composed of steam sealed labyrinths and water seals, as shown in Figs. 8 and 9. The labyrinth is of the radial type, the strips being held out against shoulders in the groove by flat springs. The steam gland is sealed from an annular chamber and port as shown. The water seal operates on the principal of a centrifugal pump. The impeller is provided with radial paddles or ribs, and revolves in a chamber, which is supplied with water at periphery of the impeller. The centrifugal action of the paddles on the water causes it to revolve and to form a ring of water under considerable pressure in the chamber, which gives a perfect seal against passage of air into or steam out of the turbine. The water seal is designed to operate from full to half speed. Below the latter speed the centrifugal force is not sufficient to maintain the seal, and, therefore, from stop to half speed, it is necessary to use the steam sealed labyrinth. The steam will, therefore, be used when steaming at very low speed, manoeuvering and standing by.

Steam is supplied to the glands from the main steam line through a reducing valve, which regulates the pressure to about five pounds gauge. Water is supplied to the glands from a gravity tank, into which the discharge of the condensate pump is led before passing to the feed tank. The former tank is located about 12 feet above the glands, which gives a pressure of about five pounds. The steam and water to the glands are led through valves which are operated by the manoeuvering valves so that the water is shut off and the steam turned on automatically in case the turbines are slowed down suddenly.

The main bearings are of the self-aligning type and are provided with pads and liners, by means of which the rotor can be adjusted vertically and horizontally. Oil is supplied through the bottom pad and is led up to a distributing groove in the top of the bearing. Felt wipers are provided around the shaft to exclude dirt.

The thrust bearing is of the Kingsbury segmental type, and is provided with means for moving the rotor endwise for adjusting the dummy clearances. This is accomplished by a nut which works on threads on the body of the bearing and is revolved in a groove in the turbine casing by a worm, turned by a hand wheel.

The turbine shaft is connected to the flexible shaft of the pinion by means of a pin coupling, which permits the pinion to move endwise. Provision is made for lubricating the coupling pins and bushings.

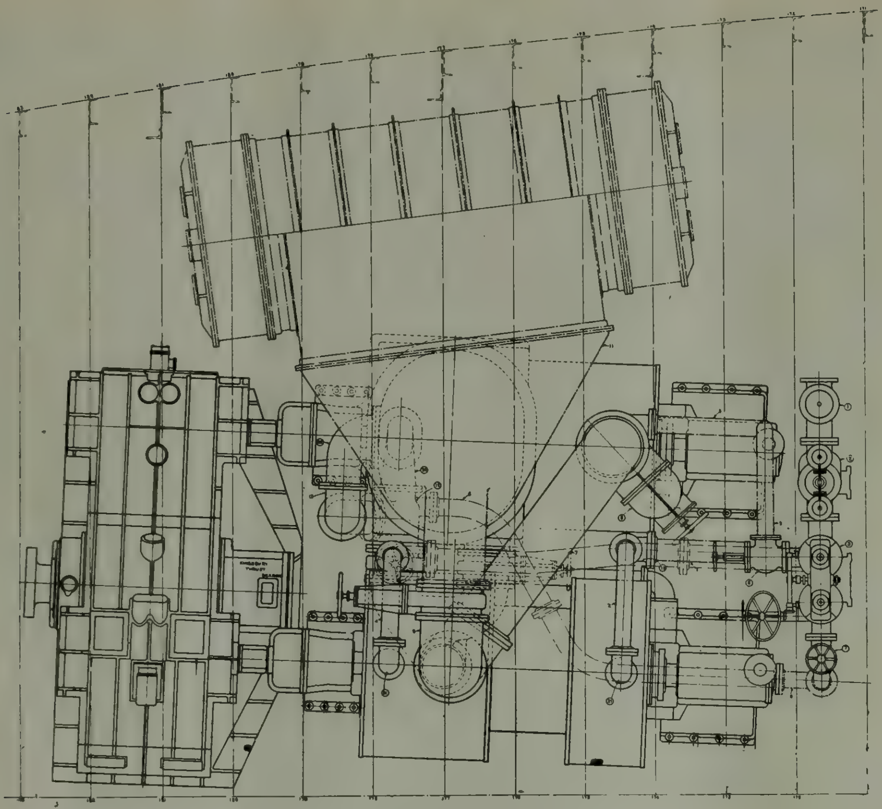


Fig. 3. Arrangement of port propelling unit (plan).

An emergency overspeed governor is located forward of the thrust bearing, and is driven from the turbine shaft by spiral gears. The governor is of the centrifugal type and controls the governor valve in the main steam line by means of a steam relay. The floating lever and pilot valve are located on the governor. Steam from the pilot valve is piped to the relay cylinder which operates the governor valve, and the motion of the latter is transmitted back to the floating lever through shafts and rods.

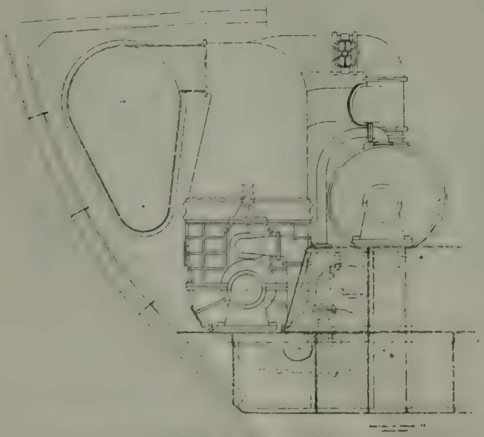


Fig. 3B. Arrangement of port propelling unit (section).

The hot portions of the turbine cylinders are lagged with non-conducting material, and the middle portion of the cylinder is enclosed in a 1/16-inch sheet metal jacket, which is arranged for removal and for access to the turbine joints.

All pockets in the turbines and piping are provided with drains, which are led into a steam ejector which discharges the water into the condenser as the latter is located above the drain level. Relief valves are located on the ahead and astern receiver pipes.

The lifting gear is composed of I-beam girders and chain hoists above the turbines and gears, and special slings and guides are provided for lifting the rotors without injury to the blading.

The turning gear consists of an electric motor, connected to the turbine rotor by means of worm gearing.

All pipe connections to the turbines are designed to allow free expansion without imposing stress on the turbine cylinders. The turbine rotors

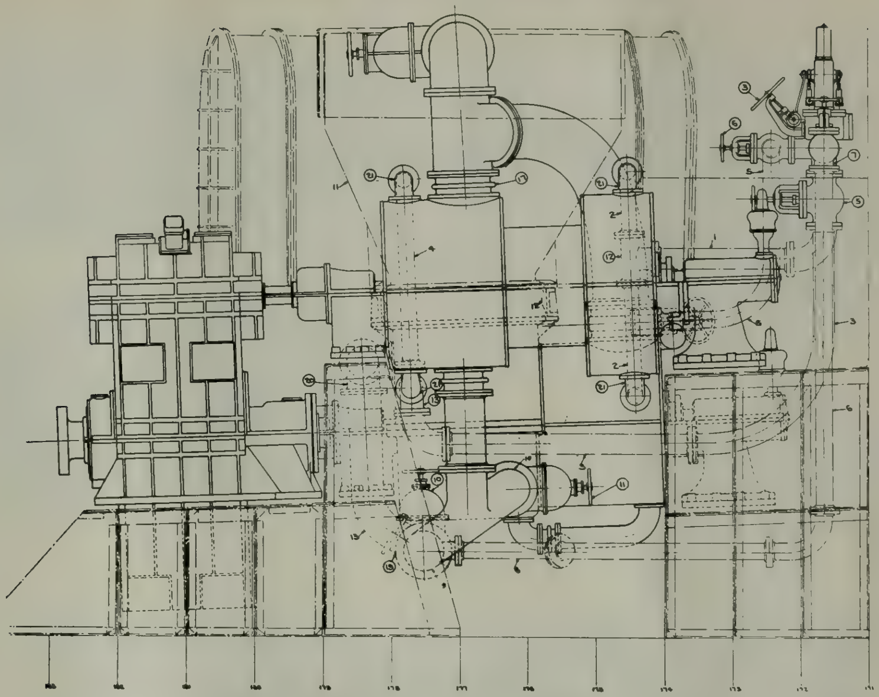


Fig. 3A. Arrangement of port propelling unit (longitudinal elevation).

will be tested to 20 per cent above the designed full speed, or to 2,400 r. p. m.

Turbine Valve Gear and Steam Piping

The admission of steam to the ahead and astern turbines is controlled by two balanced throttle valves, both of which are contained in one body and operated by the same hand wheel. The piping and valves are arranged so that in addtion to the normal cross-compound operation, either the high pressure or the low pressure ahead or astern turbines can be operated independently in case of emergency, the turbines being controlled by the main throttle valves in all cases.

The arrangement of the turbine steam valves and piping is shown diagrammatically in Fig. 10.

The steam strainer has a cast iron body and perforated steel cylindrical strainer.

The governor valve is of the double disc balanced type, operated by two steam relay pistons. The operation of the relay pistons and the opening and the closing of the valve are controlled by the turbine governors and pilot valves as previously described. The operation of either the high pressure or low pressure turbine governor will cause the valve to close in case the turbine overspeeds. With this arrangement the turbine is not shut down completely and is always under direct control of the manoeuvering valves.

The ahead and astern manoeuvering valves are contained in a single cast steel body, and are of the balanced single disc type, with a pilot valve on the valve stem for automatically equalizing the pressure in opening. Springs are provided above the valves to prevent them from chattering in the current of steam. Both valves are operated by a single hand wheel and yoke.

The main high pressure steam piping is of steel, and the low pressure receiver piping between the

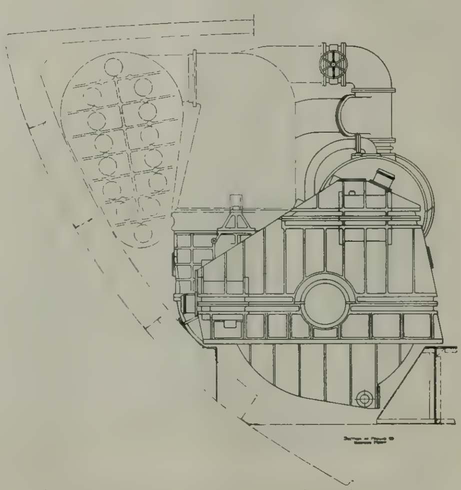
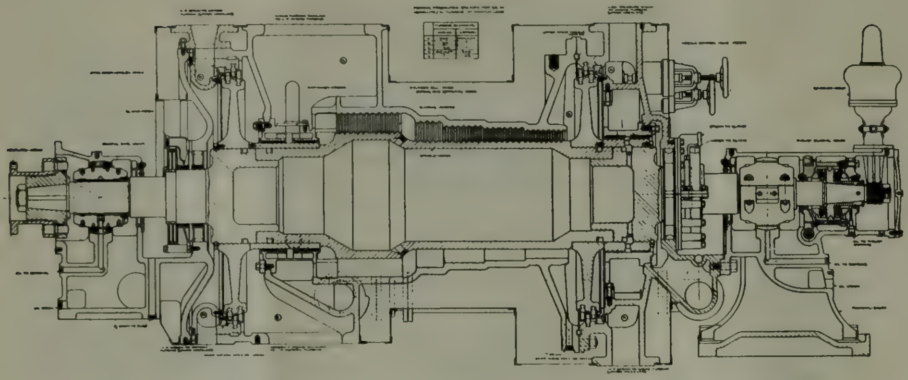


Fig. 3C. Arrangement of port propelling unit (section).



turbines and the main exhaust pipe is of cast iron. Copper expansion joints are located between the turbine and exhaust pipe and in the receiver pipes.

Reduction Gears

The reduction gears are of the Westinghouse double helical type with mechanical floating frames, as shown in Figs. 11 to 15. The floating frames are provided with hydraulic dynamometers for the measurement of power, and a Kingsbury thrust bearing is placed at the forward end to take the

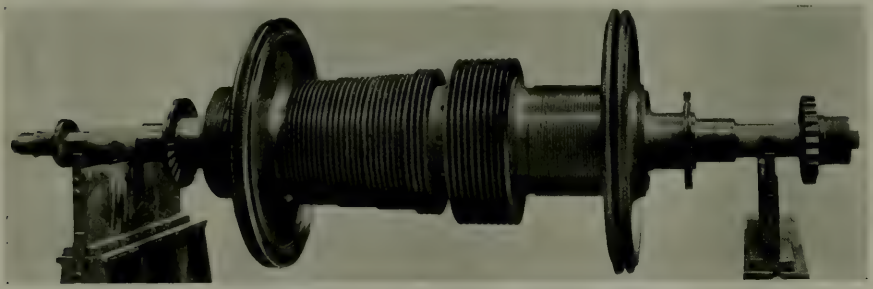


Fig. 6. View of high pressure turbine spindle showing ahead and astern (right) impulse wheels, ahead reaction blading, water gland runners, thrust collar, governor drive gear (left) and flexible coupling (right).

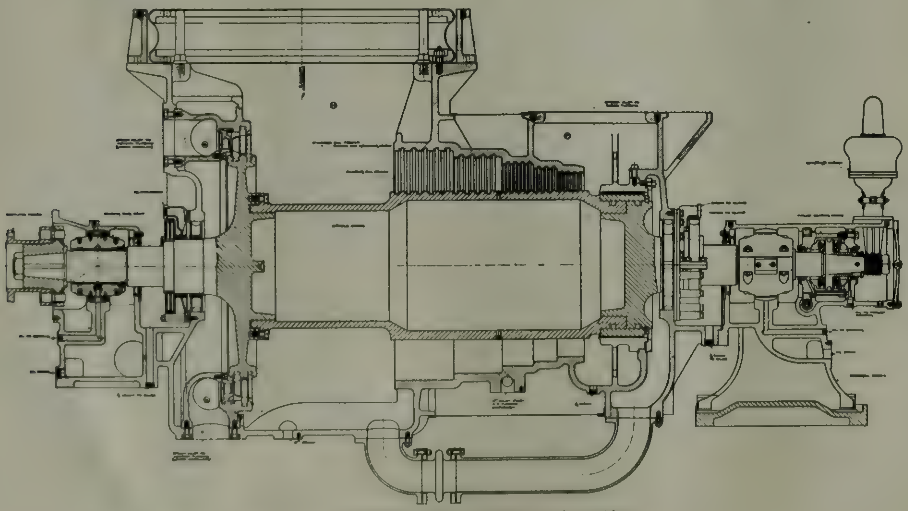
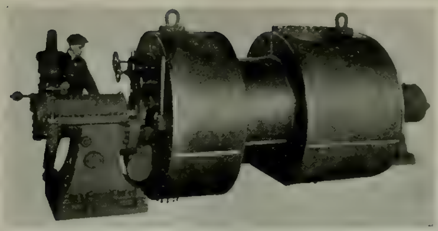


Fig. 4. Longitudinal sections through main turbines.



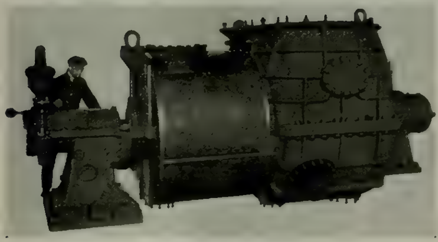


Fig. 5. Views of high and low pressure turbines completed and ready for installation

The gears are completely enclosed in an oil-tight cast iron gear box, divided on a horizontal plane. The gears are of the double helical type, the teeth being inclined at an angle of 30 degrees. The teeth are of involute form and are cut with utmost precision to obtain quiet and reliable operation.

The pinion is of the three-bearing type and is carried in a heavy floating frame, which automaticaly maintains the alignment of the pinion and gear under all conditions of load, thereby producing uniform distribution of pressure over the entire length of tooth face. The pinion is driven by a flexible shaft which extends through it and is secured to the end distant from the coupling. The flexible coupling permits the pinion to move endwise, and the flexible shaft permits it to tilt under the action of the teeth, so as to bring it into perfect alignment. The resulting uniform distribution of tooth pressure at all loads permits the use of higher pressures and smaller pinions and gears than is the practice with rigid-bearing gears.

The floating frames are of extremely rigid cast steel construction to avoid deflection, and are supported by feet under the middle bearing. The pinions are single steel forgings. The gear wheels are composed of a heavy steel forged shaft, cast iron center and steel rims. The gear and pinion bearings are composed of heavy cast iron bodies lined with white metal, and are supplied with oil under a pressure of about 5 pounds from the main oil system. No oil piping or fittings are contained within the gear box. An abundant supply of oil is sprayed on the pinion so as to pass between the meshing teeth and afford the required lubrication and cooling.

Hydraulic Dynamometers

Westinghouse hydraulic dynamometers for measuring the power transmitted are incorporated in the pinion frames. The dynamometer is composed of two pistons, one above and one below, which seat on brackets formed in the gear box and operate in cylinders in the floating frame. Normally the feet of the frame are bolted securely to the gear box with long bolts which extend up through the cover, but when it is desired to measure the power these bolts are unscrewed sufficiently to permit the frame to float on the hydraulic pistons.

The hand control valve on the control arm of the frame is then opened, permitting oil to flow from the bearing into the cylinder, until the frame is raised from its seating slightly, which is indicated by the pointer on the control arm. (The pinion journal acts as a pump and supplies a considerable flow of oil under high pressure.) Since the frame is then supported by the oil pressure, the total pressure on the piston, corrected for the weight of the pinion and floating frame, represents the total pressure on the pinion teeth, and this, combined with the pitch-line speed, gives the horsepower transmitted by the gear. Or actually the gauge pressure of the oil in the dynamometer cylinder, and the revolutions per minute, are observed, and after correcting the former, the power is obtained from their product multiplied by a

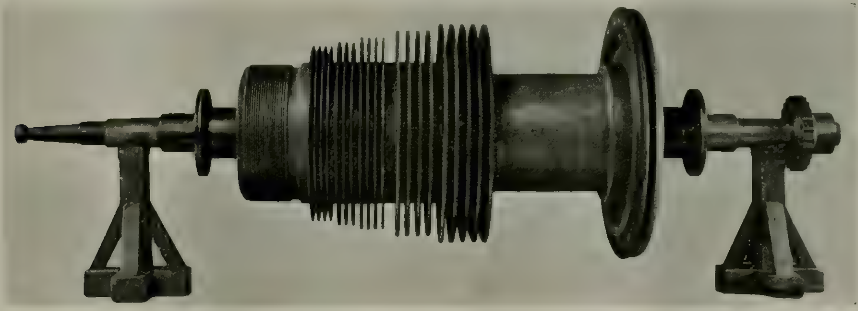


Fig. 7. View of low pressure turbine sprindle showing ahead reaction blading, astern impulse wheel, water gland runners, and flexible coupling (right).

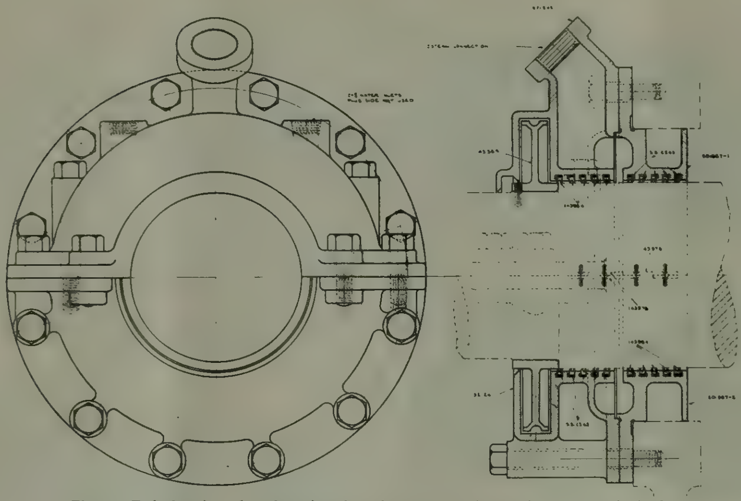


Fig. 8. End elevation of, and section through steam labyrinth and water-sealed gland.

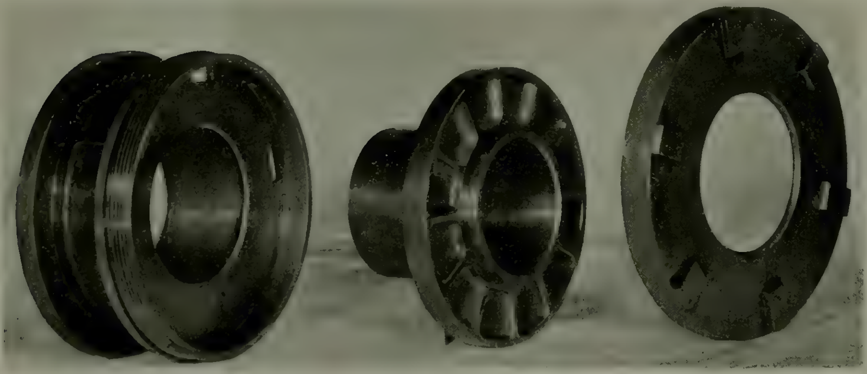


Fig. 9. Photograph of water sealed gland for small turbine, showing impeller and seal chamber.

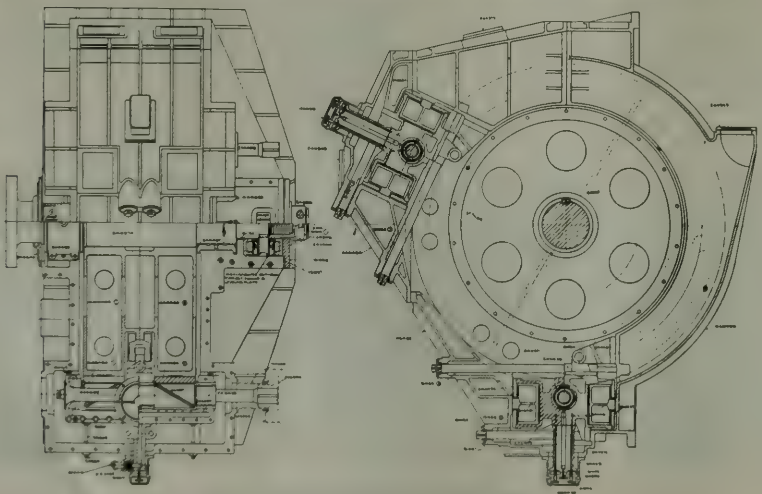


Fig. 11. Section through main reduction gear.

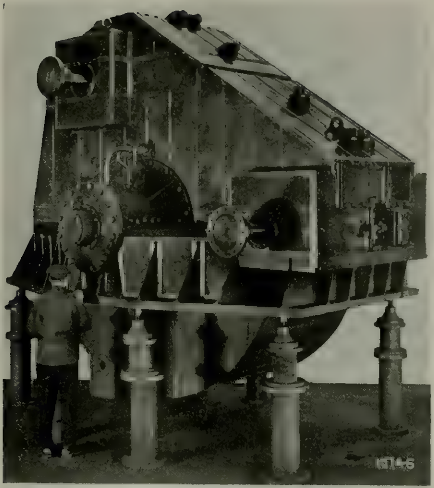


Fig. 12. View of completed reduction gear showing pinion couplings and thrust bearings.

constant. The sum of the power transmitted by both pinions gives the total power transmitted by the gear to the propeller, and of course the sum of the two gears gives the total power of the main turbines. The formula used is as follows:

S. H. P. = C p R,
Where C = Dynamometer constant.
p = Pressure in dynamometer cylinder in pounds per square inch (corrected).
R = Revolutions per minute of propeller.

Kingsbury Thrust Bearing

The Kingsbury thrust bearing, which takes the thrust of the propeller, is located in the forward end of the gear, and is composed of a single collar which operates between segmental slippers made of cast steel and lined with babbitt. Each slipper is pivoted on a hardened seat which permits it to automatically assume the required position to distribute the load uniformly over the surface. This uniform distribution of pressure over the entire bearing surface, due to the self-alignment of the slippers, gives perfect film lubrication, permitting the use of a considerably higher unit pressure than is possible in ordinary thrust bearings, and with greater reliability of operation.

The principal parts of the bearing are made of forged and cast steel. The bearing is lubricated by a continuous circulation of oil which is admitted near the bottom and completely fills the casing, the outlet pipe being led from the top of the casing into the gear box. Since the trust is transmitted to the ship's structure through the gear box, the necessity for an independent thrust-block foundation is obviated.

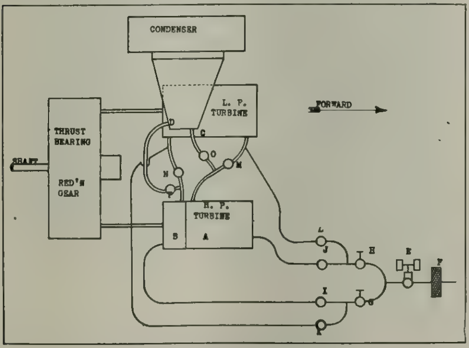


Fig. 10. Diagram showing steam piping and valves of main turbine. A, high pressure ahead turbine; B, high pressure astern turbine; C, low pressure ahead turbine; D, low pressure astern turbine; E, automatic governor overspeed valve; F, steam strainer; G, ahead throttle valve; H, astern throttle valve; I, high pressure ahead turbine cut-out valve; J, high pressure astern turbine cut-out valve; K, emergency steam valve to ahead low pressure turbine; L, emergency steam valve to astern low-pressure turbine; M, ahead low pressure turbine cut-out valve; N, astern low pressure turbine cut-out valve; O, ahead high-pressure turbine emergency exhaust valve to condenser; P, astern high pressure turbine emergency exhaust valve to condenser.

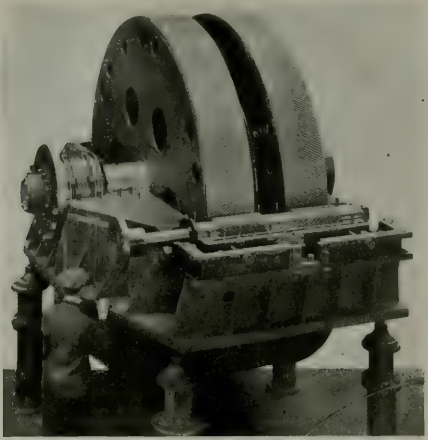


Fig. 13. View of reduction gear with cover removed showing pinion, floating frame and thrust bearing.

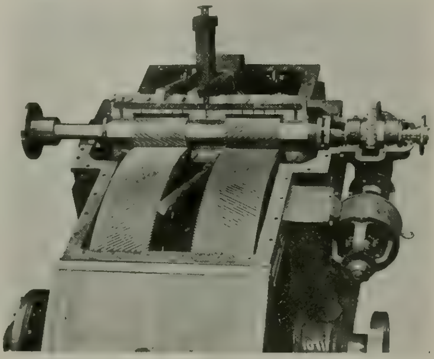


Fig 15. View of reduction gear with upper section removed showing pinion, gear, floating frame, lubricating oil channels and sprays and turning gear.

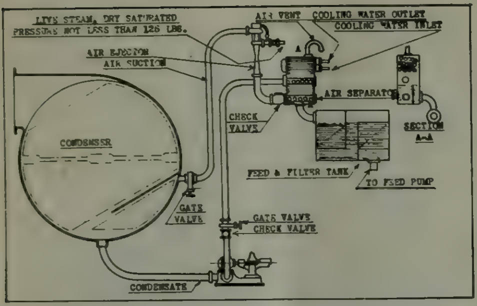


Fig. 16. Diagram showing arrangement of condensing plant equipped with Westinghouse-Leblanc air ejectors and turbine driven centrifugal condensate pumps

Condensing Plant*

The condensing plant is of the latest Westinghouse type for producing the high vacuum required by turbines, and is composed of a steel plate condenser, a geared turbine-driven centrifugal circulating pump, a turbine-driven centrifugal hot-well pump, and two Leblanc air ejectors for each main unit. The condenser heads are of cast iron, and it is arranged for three passes of cooling water, as shown in Fig. 17. The tubes are ⅝ inch outside diameter and are 12 feet long between tube plates, the cooling surface for each condenser being 8000 sq. ft. With 70° cooling water, the condenser is designed to produce a vacuum of 28½ inches of mercury referred to a 30-inch barometer.

The main circulating pump is of the single runner slow-speed type as designed for high efficiency, and is driven by a geared turbine unit, the revolutions of the pump being 390 and of the turbine 5836. These speeds give a high efficiency for both pump and turbine, which results in a very economical unit. Each pump has a capacity of 9200 gallons per minutes and requires 105 h.p. The pump has a cast iron body and a double-inlet bronze runner. The glands are packed with flax packing and are provided with water seals to prevent air leakage. The rotor is carried between two bearings, one on the gear and the other on the pump body.

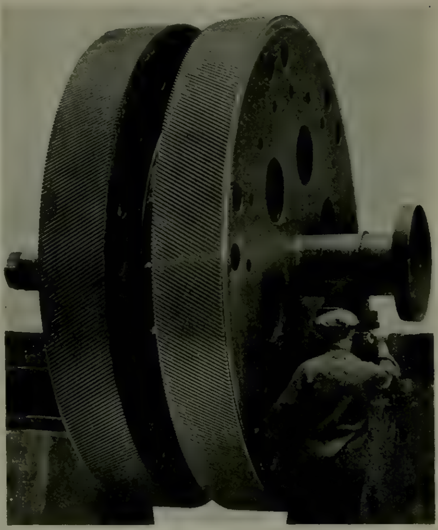


Fig. 14. View of reduction gear wheels (note large size).

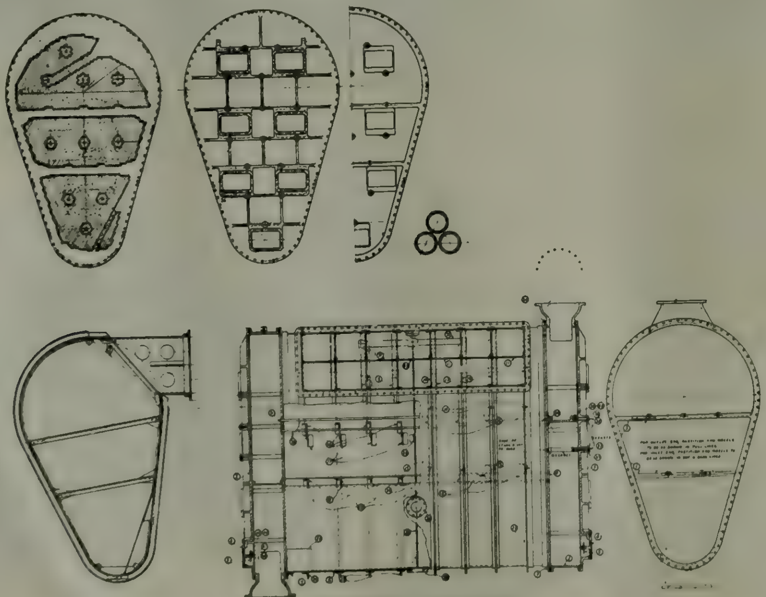


Fig. 17. Arrangement of main condenser.

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*A description of the Westinghouse Leblanc air-ejector system for producing high vacuum is given in "Marine Engineering," December, 1915, in the article entitled "New Vacuum Apparatus."

The gear is of the double helical type enclosed in a cast iron box. A centrifugal governor which regulates the speed of the turbine is driven from the gear shaft by spiral gears.

The turbine is composed of a high-speed impulse wheel with a single row of blades through which the steam passes twice. The shaft is provided with water-sealed glands where it passes through the casing. At full speed, the speed of the turbine is regulated by the governor, which operates a balanced valve, but lower speeds are obtained by hand throttling.

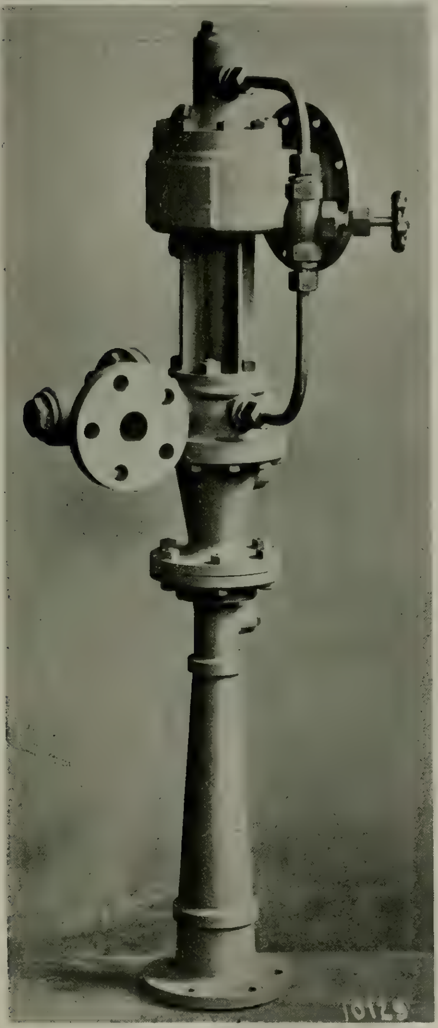


Fig. 18. Photograph of Westinghouse-Leblanc air ejector.

The turbine bearings and reduction gear are supplied with a continuous circulation of oil from the main lubricating system, the gear teeth being lubricated by sprays.

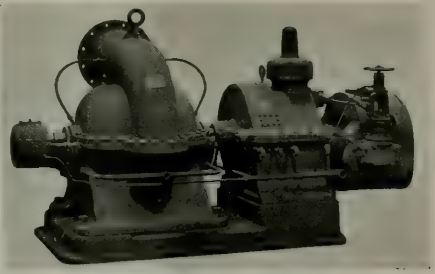


Fig. 19. Photograph of geared-turbine driven main circulating pump.

There is a condensate or hot-well pump for withdrawing the condensate from each condenser. The pumps are of the centrifugal type and are direct turbine driven. They are located below the condensers so that the condensate will drain into them by gravity. The condensate is discharged up into a small tank from which is taken the gland sealing water, thence it overflows into the air-ejector tank, and from there passes into the feed tank. The revolutions per minute are 2500.

The pump is of bronze and is of the single inlet type, with a water-sealed gland to prevent air leakage.

The turbine is of the impulse type with a single row of blades, through which the steam passes twice. The casing is split horizontally and lagged and fitted with labyrinth type glands. The rotor is carried in two ring oiled bearings. The speed is regulated by a centrifugal governor, mounted on the turbine shaft, which operates a balanced governor throttle valve.

Westinghouse-Leblanc air ejectors are provided for withdrawing air from the condenser. For each condenser there are two ejectors, one being sufficient for full-load requirements and the other being provided as a spare. The air is withdrawn by

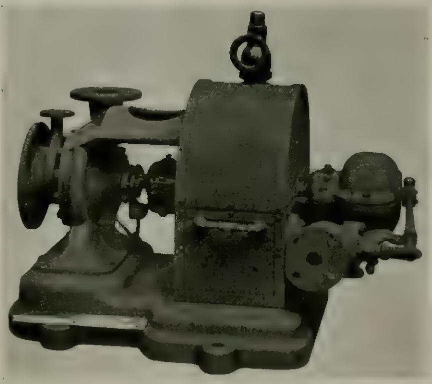


Fig. 20. Photograph of turbine driven condensate pump.

multiple jets of steam in series which compress the air to atmospheric pressure. The mixture of air and steam then passes into the air-ejector tank, where the steam is condensed and the air escapes to the atmosphere. The air ejectors are made of bronze, and the tank of cast iron.

Lubricating System

The lubrication of the main turbine bearings, the gear teeth and bearings is effected by a continuous circulation of oil through a gravity system composed of delivery and return piping, pumps, cooler, and filter tank. Oil is supplied to bearings and teeth under a pressure of about 5 pounds from a gravity tank. The oil first passes through a cooler, and is then supplied to the bearings and gear teeth, after which it drains back into the drain tank. From the latter it passes into the oil pumps, which discharge it back into the gravity tank through the strainers located in the top of the tank.

The gravity and storage tanks are of steel plate of rectangular form, the piping being of galvanized iron. The cooler is composed of a nest of condenser tubes in a cast iron box. The cooling water passes through the tubes and is supplied from the sanitary pump.

Discrimination at the Canal

When the President chose Professor Emory Johnson to formulate a set of rules for the use of the Panama Canal and the fixing of tolls, he picked a person who was naturally unfitted for the task, and the result has only been what might have been expected. Certain foreign journals took keen delight in poking fun at such things as "reefing the bowsprit" and swinging the spars parallel to the center line of the ship, but they would have displayed far better taste had they printed laudatory articles on the work of Professor Johnson, since his measurement formula taken in conjunction with the United States net tonnage decision of the Attorney General form a dual basis of measurement that has worked out very decidedly to the advantage of the foreign ship.

The first difficulty with the canal measurement rules rose through the formula for fixing tolls on deck loads. The Pacific Coast shippers were heavily interested in lumber as a freight and were anxious to widen as far as possible the competitive range of western woods. Now, under the rules, a vessel loaded to her deadweight capacity with all cargo below deck would pay tolls on the Panama Canal tonnage. The same vessel, timber laden, would pay not only the same amount as formerly, but tolls on her deck load in addition. Assuming the deadweight carried as being identical in each case, the difference in the total amount of tolls paid was a super-tax on lumber, a commodity which, in normal times, can only stand a low freight rate.

Pacific Coast lumber and shipping interests protested against this handicap on timber and the Attorney General ruled that the tolls should be $1.20 per canal measurement ton but should in no case exceed $1.25 per United States net registered ton. This ruling was no more than justice to the lumber interests throughout the country, but at the same time by injecting a second method of figuring the amount of tolls to be paid, a confusing and difficult task was thrown upon the canal measurers, excess tolls had to be accurately determined and refunded to those who had paid them, and conditions were set up which, on the whole, worked decidedly to the advantage of the foreign ship and at the same time discriminated betwen different types of vessels.

The Hay-Pauncefoot treaty fixed the status of the Panama Canal as being international in the sense that the vessel of no nation should be discriminated against. A movement was set on foot to have American coastwise vessels passed through the Canal free of tolls and at the same time to bar railroad-owned ships (providing they were erence to the free use of the Canal by American coastwise shipping, Great Britain made strenuous objection and, notwithstanding the fact that the conduct of our coastwise trade is a matter which is absolutely no concern of Great Britain or any other nation, the Administration tumbled over itself to accede to England's wishes.

The arguments used by the representatives of Great Britain claiming that the free use of the Canal by American coastwise shipping was discriminatory against British shipping were so hazy and fanciful that no one but official Washington could see through them, and yet this same official Washington finds it difficult to see the present glaring discrimination at the canal in favor of the foreign ship.

That the present measurement rules of the Panama Canal, largely through their dual nature, work very favorably for foreign shipping and that the American railroad owned ship cannot use the Panama Canal while the foreign railroad owned ship is entirely welcome constitute two open breaches of the terms of the Hay-Pauncefoot treaty, although we are not likely to hear any protest on either of them from any foreign power.

That wide discrimination does exist in the assessing of Panama Canal tolls is not a matter of opinion or theory, but a plain, unasailable fact, as anyone who will read the annual reports of Colonel Goethals will quickly ascertain.

In the annual report of the Governor of the Panama Canal for the fiscal year ending June 30, 1915, on pages 36 and 37, we find the following:

"The tolls collected on deck cargoes was questioned by the Pacific Coasts interests and the matter was referred to the Attorney General for an opinion. It developed that in some cases tolls were being assessed in excess of those required by law; it developed that in lieu of the Panama Canal measurements, the net registered tonnage of the United States must apply. Much to our chagrin and humiliation, we learned that Dr. Johnson was aware of the discrepancy, notwithstanding which, he presented his rules of measurement and rates of tolls for promulgation to the shipping interests of the world. Confusion has been the order of the day in consequence. The amounts collected in excess of that authorized by law will have to be refunded, and while this will reduce the revenues received, this matter is still small in comparison with the difficulty of arriving at a clear-cut system of measurement applicable to all cases that arise on the canal, when the net registered tonnage is dependent not only upon law, but upon rulings and decisions of the Commissioner of Navigation, whose dictum in any particular case is final. These rules, findings and laws are made with a view to reduce the discrepancies in harbor dues, etc., for the United States. They are made applicable to the Panama Canal when they should not be. Their application on the Isthmus has resulted in discrimination as between ships, causing friction and bitterness, and instances have arisen where the application discriminates in favor of foreign ships as against American ships."

This report was written over eighteen months ago, and the "instances" referred to in the last sentence quoted have multiplied since. In the same report, from pages 218 to 222, will be found a highly interesting statement by Hugh Rodman, Marine Superintendent of the Canal, in which some specific cases of discrimination are cited. A few excerpts from this gentleman's report to the Governor of the Canal will suffice to completely illuminate the conditions surrounding measurement discrimination.

"The steamship 'Charlton Hall,' which passed through the Canal June 29, 1915, was formerly a British ship and was admitted to U. S. registration December 31, 1914, retaining her original national registered tonnage of 2,999.51 tons. Had this vessel been remeasured in accordance with the U. S. rules in vogue at that time, her net tonage would have been 4,168.11 tons, a difference of 1, 168.60 tons, equivalent in tolls to $1,402.80, which are now lost to the canal." Here is a clear case of discrimination against the American shipbuilder and the American shipowner who holds American built ships.

Again quoting Mr. Rodman:

"The steamship 'Aboukir' had a bridge space amounting to approximately 337 tons, the steamship 'Tottori Maru' had a bridge space of approximately the same size as the 'Aboukir.' In both cases the said spaces were easily and readily made water-tight and could have carried freight thoroughly protected which, had the circular not been issued, would have been subject to measurement and tolls. The 'Aboukir' was allowed a propelling power reduction of 32 per cent of her gross tonnage and the steamship 'Tottori Maru' a deduction of 175 per cent of the propelling power space."

"So far as commercial vessels are concerned that use the canal, they may be divided into three classes: (a) those built and registered in the United States, (b) those built abroad and admitted to U. S. Registration under their original foreign measurement and tonnage in accordance with the Act of Congress of August 18, 1914, and (c) foreign vessels not admitted to U. S. registration. In acordance with existing laws and equity, on the arrival of these vessels at the canal, in the matter of levying tolls and computing the factor of U. S. net registered tonage or its equivalent, these three classes may be measured each on a different basis from the others, in which, without going into details, the foreign built vessels will generally have an advantage over those which were built in the United States."

"In spite of the fact that a circular (No. 240), of September 21, 1914, of the Department of Commerce states that 'the measurement laws of the U. S. and the principal maritime nations are substantially the same,' it has not been found so at the canal in the administrative application of tolls; on the other hand, there are many differences. So different were they, in fact, when this circular was issued that under the U. S. rules shelter-deck and closed-in space, under certain conditions, was measured and added to a vessel's net tonnage and both tonnage dues and tolls were levied on it; yet under the British law this same space would be exempted. This is far from being a small item, and not infrequently amounts to over 1,000 tons in a single vessel, or $1200 in tolls."

"Claim was made for refund of tolls on the Norwegian steamer 'Arna' and the British steamer 'Wray Castle.' The 'Arna' passed through the canal in October, 1914; her foreign net registered tonnage is 3,249, her equivalent U. S. net registered tonnage, 4,630, a difference of 1,381 tons. The 'Wray Castle' passed through in March, 1915; her foreign registered net tonnage is 2,717, her equivalent U. S. net tonnage, 4,133, a difference of 1,416 tons."

Since the confusion in the levying of tolls that existed when the 1915 report of the Governor of the Panama Canal Zone was so clearly and forcibly set forth, it would seem that Congress would have made haste to remedy the matter, especially since the dual measurement basis in vogue was resulting in loss of revenue to the canal. However, in the 1916 report we find the same conditions prevailing. In the report of Commander H. I. Cone, Marine Superintendent, embodied in the Governor's report, page 218, we find the following terse statement of the case.

"Considering the U. S. rules for measurement as a factor in the levying of tolls has resulted in exempting practically all shelter-deck spaces and deck loads of vessels transiting the canal, which in turn has resulted in discrimination against most of the United States vessels transiting the canal during the year, owing to the fact that almost all U. S. vessels are so constructed that they are unable to take advantage of shelter-deck space."

That lumber as a deck load is entitled to the fullest consideration goes without saying. It is a commodity which could hardly be commercially handled without resorting to deck loading, and the specially constructed lumber carrier is more seaworthy with a deck load than without one, providing, of course, that a reasonable limit is set upon her deck cargo. However, the injection of the U. S. net registered tonnage as a limiting basis for the levying of tolls was a very ill advised move since the Panama Canal tonnage and the U. S. net registered tonnage have little in common. The two measurements were formulated with entirely different ends in view, and when used in conjunction present, in several types of vessel, a wide fluctuation in the amount of canal dues that may be exacted. Furthermore, the two sets of measurement emanate from different sources with resultant confusion and inexcusable delays in the matter of refunds, etc.

It is indeed startling that a condition which militates against the American ship should be allowed to continue year after year despite the fact that it has been called to the attention of the Administration. It is a sad commentary upon the statesmanship and foresight of official Washington that, in order to relieve a super-tax on lumber, they blunderingly discriminated against the American ship, especially when the relief begged for by the lumber interests might have been easily arranged for through a few simple amendments to the Panama Canal measurement rules.

The "North West America"

By J. WYLLIE

TO Captain John Meares and associates, with the aid of a few Chinese carpenters, is due the honor of having built the first seagoing vessel launched on the Pacific shores of North America—the schooner "North West America."

In 1786 Captain Meares, a retired English naval lieutenant, visited the Alaskan coast in command of the ship "Nootka," of Bengal, on a trading voyage. His cruise having proven successful, two years later he was given command of an expedition consisting of the ships "Felice" and "Iphigenia" of 230 and 200 tons respectively, belonging to British India merchants and outfitted at the port of Macao, China. The "Felice" arrived at Nootka Sound on May 13, 1788, the "Iphigenia" having proceeded to the northward.

Nootka, although scarcely entitled to be called a settlement, was a favorite rendezvous for vessels trading to the coast, and the most important place north of San Blas. In accordance with instructions from the owners to do everything in his power to retain friendly relations with the natives as well as to lay down correct charts of places visited for the benefit of navigators and to advance the knowledge of geography, Meares secured from Chief Maquinna the use of a piece of land adjacent to the village upon which to erect a permanent establishment and to build a small vessel, material for which had been brought from Macao, together with a number of Chinese carpenters.

Work was immediately begun, but I cannot do better than quote Meares' own words with reference to the undertaking, and wish that he and other pioneers in that line might be permitted to return to visit the shipyards of the Pacific Coast today. Writing about shore quarters being established and a house and breastworks built, he states: "Without this breastworks was laid the keel of a vessel of 40 or 50 tons, which was now to be built agreeably to our former determinations." He then describes the work of getting out the timbers and the dressing and placing of them while the armorers attended to the iron work as the little vessel took shape. When she was fairly started, Meares proceeded on his trading cruise, leaving the work in charge of Mr. Robert Fuuter, second mate of the "Felice."

With some aid from the natives in getting the heavy timbers from the yard, the work of construction progressed favorably, and by the middle of September the vessel was ready to launch. The "Felice" and her consort had returned, and on the 17th the sloop "Lady Washington" of Boston, Captain Robert Gray in command, arrived on the Sound, so that the launch, which took place on the 20th, had an international air in keeping with its importance.

To again quote the commander: "On the 20th, at noon, an event to which we had long looked

The launch of the North West America at Nootka Sound. This print was first published by J. Walter and Son, No. 169 Picadilly, London, in 1790.

with anxious expectation and which had been the fruit of so much care and labor, was ripe for accomplishment. The vessel was there waiting to quit the stocks; and to give all due honor to such an important scene, we adopted as far as was in our power the ceremony of other dockyards. As soon as the tide was at its proper height, the ensign was displayed on shore at the house and on board the new vessel, which at the proper moment was named the 'North West America,' as being the first bottom ever built and launched in this part of the globe."

Commenting on the feelings natural to such an occasion, he wrote that: "The thought of the labor that produced it; the spectators that beheld it, and the commercial advantages as well as civilizing influences connected with it will attach some little consequence to its proceedings in the mind of the philosopher as well as in the view of the politician. But our suspense was not of long duration. On the firing of a gun the vessel started from the ways like a shot. Indeed, she went off with such velocity that she had nearly made her way out of the harbor; for the fact was, that not being very much accustomed to the business, we had forgotten to put an anchor and cable on board to bring her up * * * the boats, however, soon caught and towed her to her intended station."

Fuuter was given command of the new vessel, which accompanied the "Iphigenia" to the Sandwich Islands, which were then, as now, a favorite port of call and a convenient place where explorers and traders might recuperate after an arduous season on the northwest coast. In April of the following year the two vessels returned to Nootka, and the "North West America" was dispatched to the north to trade. Meares, who at the close of the preceding season had loaded the furs collected on the "Felice" and sailed for China, did not return, and Captain Douglas does not seem to have been competent to cope with the situation which arose.

In brief, the Spaniards and British were both trying to secure a permanent hold on the Northwest coast, the former having the best of it on account of their naval base at San Blas. A Boston trading expedition, consisting of the ship "Columbia," Captain Kendrick, and the sloop "Lady Washington," Captain Gray, had already been operating on the coast and had again arrived at Nootka when the "Iphigenia" and the schooner returned from the Islands. In order to evade the excessive port charges on foreign vessels at Macao, Meares' ships had been registered in the name of a Portuguese merchant of that city who held a small interest in them, so that the vessels were flying the flag of Portugal.

The "Boston men," like the Spaniards, were jealous of the success of the "King George" men and the Spanish ship of war "Princessa," having arrived in the Sound while the "Iphigenia" was undergoing repairs, Kendrick prevailed upon the Spanish commander, Lieutenant Martinez, to put an end to their rival's activity by seizing their ships. This was agreed to, and the "Iphigenia" declared a Spanish prize. When the "North West America" returned, about the middle of the season, she too was seized, as likewise were two new ships, the "Princess Royal" and "Argonaut." These two ships also belonged to the Meares company. On his arrival in China, Captain Meares had proceeded to reorganize his concern, sold the "Felice" and purchased the new ships, which were placed under the British flag.

In the meantime, Martinez, fearing that he had exceeded his authority, returned the "Iphigenia" to Captain Douglas, but kept the others. The crew of the "North West America" were sent on board the "Columbia," which later landed them in China, the vessel herself being sent north on a trading cruise in the interest of its captors and in command of the mate of the "Lady Washington." At the end of the season she was sent to San Blas with the other prizes, and is supposed to have been renamed the "Santa Gertrudis," as which she is said to have made several voyages on the coast, but as this has not been authenticated and no record of service has been found to supplement that already related, we must perforce remain in ignorance of the fate of this pioneer vessel which bore for such a short space of time the name of the new land to which she owed her birth.

The next new vessel to kiss the waters of the North Pacific was also built on Vancouver Island. Captain Gray, of the "Lady Washington," having been promoted to the command of the "Columbia," in 1791 again sailed from Boston for the Northwest Coast. After the season's trading, Captain Gray went into winter quarters in Clayoquot Sound, to the southward of Nootka, and while there superintended the building of a sloop, materials for which had been brought out in the "Columbia." The vessel, which was named the "Adventure," was launched on the 23rd of February, 1792, but of her dimensions and service I have been unable to learn.

A Great Repair Yard

THE demands of shipowners upon those who supply them with the tools wherewith they carry on their trade are nowhere more persistent than on the ship-repair plant. This extraordinary demand for ship repairs has been felt more keenly on the Atlantic Coast of the United States than anywhere else in the world. The reasons for this are obvious. The yards located in the countries now at war have no time for repair work and it was to these very yards that the shipping of the European neutrals looked largely for the upkeep and repair as well as a goodly portion of the building of their merchant marine. The natural result of all this has been a heavy demand on the capabilities of the American repair yards, a demand that has been still further intensified by the fitting out and overhauling of old vessels that had been laid aside but which have demanded rejuvenation under the prevailing high freight rates.

No yard in the United States was so well prepared to meet the exigencies of the situation that arose both in the matter of equipment and experience as the Robins Dry Dock and Repair Company of Erie Basin, New York. This yard has long held the premier place as a repair job in America and has a long list of difficult repair jobs completed in record time to its credit.

The Robins plant at Erie Basin has five large drydocks, as follows: No. 1, a graving dock 510 feet long; No. 2, a graving dock 620 feet long; No. 3, sectional, 370 feet long; No. 4, sectional, 560 feet long, and No. 5, sectional, 370 feet long. Plans are now under way for enlarging one of the graving docks to enable it to take any vessel that ever comes to New York.

In the matter of shop equipment, the Robins plant is peculiarly well fitted. A splendid new machine-shop was recently completed and fitted with the most modern and efficient tools. Ample power has been furnished to operate the plant at the highest pressure, large air-compressors furnish power to the pneumatic riveters, the necessity for concentration on large repair jobs that must be finished in limited time making ample riveting power absolutely necessary. Shop machinery, etc., is driven electrically and electric-driven pumps are used for unwatering docks Nos. 1 and 2. In addition to the docks at the Robins plant, there is ample fitting-out wharves and every facility for carrying on repair work after the necessity of a ship occupying one of the docks has passed away.

One of a long series of notable repair jobs performed at the Robins plant was the removal and renewal of the stern frame on the Anchor Line steamer "Cameronia." While the "Cameronia" was laid up at New York awaiting the arrival of the new stern frame casting, the "Campania" was chartered by the Anchor Line from the Cunard Line to take her place. Hardly had the "Cameronia" been placed upon the dock when news came of the stranding of the "California" on the Irish coast and, severely crippled by the laying off of two big steamers, the Anchor Line requested the Robins Dry Dock management to rush the work

The steamship "New York" in one of the docks of the Robins Shipbuilding and Dry Dock Company.

ROBINS DRY DOCK AND REPAIR CO
SHIPYARD ENGINE AND BOILER WORKS

New machine shop recently added to the Robins plant.

The steamship "St. Paul" undergoing repairs and overhauling in a Robins' dock.

The steamship "Kristianiafiord" in dry dock.

on the "Cameronia" as much as possible. The concern placed a day and night shift on the vessel in an attempt to get her repairs finished as much ahead of the specified time as possible.

The work of taking out the broken frame necessitated the removal of twenty-two shell plates, the removal of both propellers, the disconnecting of all line shafting and the drawing in of the tail shafts and stern tubes. In addition to this wok, there was extensive repairs to the engines, not originally contemplated when the vessel was turned over to the drydock concern. Despite the extra work not originally figured upon, the "Cameronia" was completely overhauled and ready for sea eleven days before the specified time. The dispatch given this vessel enable the Anchor Line to take care of its bookings for the balance of the season without undue interruption to their sailing schedule.

The steamer "Momus" in dock receiving a new rudder.

Still another class of work in which the Robins Dry Dock and Repair Company has earned an enviable name for itself is the lengthening of vessels, sometimes referred to as ship surgery.

It is this class of experience coupled with organizing ability and the insight required to pick able men as his assistants that has enabled the president of this concern, Mr. Todd, to not only make a remarkable and continued success of the Robins Dry Dock Company but also to become one of the leading figures in the present American shipbuilding revival. The Todd interests now control the Tietjen and Lang plant at New York, the Seattle Construction and Dry Dock Company at Seattle and are erecting a great steel shipbuilding plant at Tacoma, Washington, to be known as the Todd Shipbuilding and Dry Dock Company.

A section of the Robins waterfront. A steamer entering one of the docks.

Mr. Todd is a man of large vision and has expressed his faith in the shipbuilding future of the Pacific Northwest in an unmistakable way. His acceptance of the responsibility and risk of building one of the great scout cruisers for the American Navy marks him as one of the big men in American shipbuilding today.

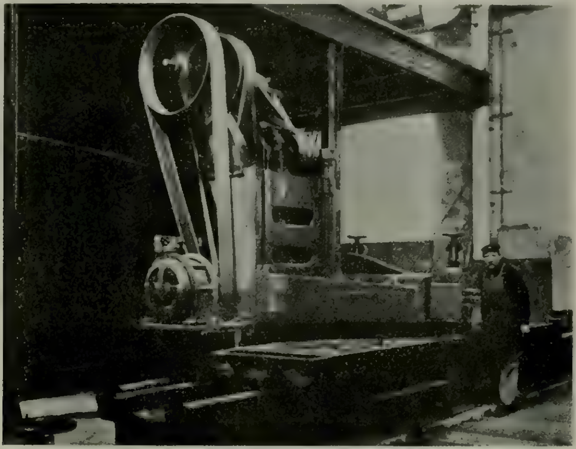
While the Robins Dry Dock and Repair Company have undertaken some new construction, it is chiefly as a repair and dry dock plant that its reputation as the leading concern of this character on the Atlantic Coast has been built up.

The Tietjen and Lang Dry Dock Company also possesses a fine dry dock and repair plant for both wooden and steel vessels. This concern operates no less than nine dry docks at its Hoboken plant.

The Seattle Construction and Dry Dock Company, originally the Moran Brothers plant, needs no introduction to the people of the West Coast as it was the second large steel shipbuilding plant to spring into existence on this side of our country. It has a large number of fine craft to its credit and at the present time has a large amount of new construction under way.

The new yard at Tacoma is being rushed to completion, back filling and bulkhead work is under way, contracts for piling and wharf building are being let, building berth foundations are being put in place and a few months will witness actual construction on steel hulls well under way.

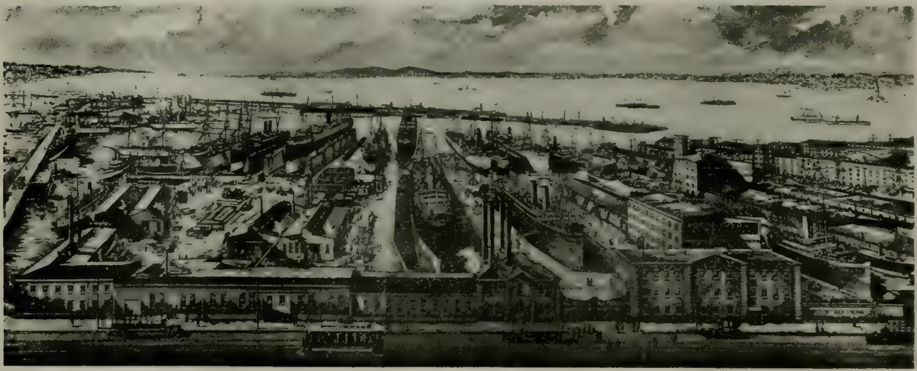
With two of the finest equipped and most esteemed repair yards in the East and two splendid shipbuilding establishments in the West, the interests headed by Mr. Todd have assumed a leading place in the country's shipbuilding and ship-repairing business and if past is any criterion on which to base an opinion, these plants will prove an honor both to the engineering and shipbuilding professions and to their owners.



A large planer in operation. The Robins plant is well equipped with the most modern machine tools.

NEW INSURANCE AVAILABLE

The American Steamship Owners Protection and Indemnity Association established in New York is now doing business on this Coast under the management of Johnson and Higgins. This concern handles what is usually called "club" insurance, which protects owners against claims for loss of life and personal injury for which a vessel may be libelled. Certain other risks which cannot be taken care of under the ordinary marine policy are also handled.



A bird's-eye view of the immense plant of the Robins Dry Dock and Repair Company, Erie Basin, New York.

European Marine Notes

Exclusive Correspondence of "Pacific Marine Review"

London, January 25th, 1917.

IN view of the great shortage of shipping, it is understood that the Government has in hand an important scheme for adding to the British merchant fleet. It is no longer a secret in the shipbuilding trade that the Government has issued specifications for a number of cargo steamers of the single-deck type, to carry 8,000 to 10,000 tons d. w., which are to be as simple and inexpensive in design as possible, in order that they can be turned out quickly. The hulls and machinery are to be standardized, and the vessels are to have priority in construction.

* * * *

After the war is over the vessels will be offered for sale to private owners, and when that time comes they are certain to find ready buyers. Thus, before the year is half spent, the country will be in possession of some 400,000 to 500,000 tons of useful shipping, ready for employment in supplying the nation with food and raw materials.

This program has the merit of being practical and effective. It is certainly better than leaving the gap to be filled by private enterprise with the inevitable delays which would ensue. Labor and materials can be arranged for on a war footing by Government control, and the work should progress swiftly. Moreover, in the Controller of Shipping and the excellent representative committee which is assisting him the scheme is in good hands, for these shipbuilders and shipowners understand their business and can see the thing through far better than Government officials.

Mr. Macassey's New Post

Lynden Macassey's appointment to assist in the organization of shipyard and marine engine shop labor is a result of the Shipping Controller's decision to expedite the construction of merchant vessels. Machinery already existed for the purpose of deciding upon the types of ships to be begun, the certified vessels for which "facilities" should be given, and the yards in which new contracts should be placed. Means of co-ordinating the different and sometimes conflicting demands for shipyard and marine engine shop labor were, however, lacking, and it will be Mr. Macassey's task to provide them. Mr. Macassey's appointment is popular. In several places the opinion is being expressed that nobody was better qualified for the position, which may, it is hinted, become one of very considerable importance.

New British Chartering Department

An office was opened on January 16 at the Baltic Shipping Exchange, London, by the Inter-Allied Chartering Executive, Marine Department of the British Board of Trade. The executive is a new authority created to carry into effect the provisions of the Order-in-Council for regulating the chartering of foreign vessels in British and Allied trade. Henceforward all charters for foreign vessels on French, Italian, and British account will require to be licensed by committees representing the three countries. The intention of the regulations is obviously to ensure that all charters of foreign vessels effected by private firms shall be in the best interests of the Allied nations and to avoid unnecessary and wasteful competition. The London office is in charge of O. G. Holmden, who is assisted by R. H. Dillon, both of whom are well known shipbrokers. Although the office has been very quickly improvised, the officials were already dealing on January 16 with questions which have arisen under the new regulations.

The above-mentioned Order-in-Council was discussed at a large meeting of London brokers held on January 16 at the Baltic Exchange under the auspices of the Institute of Shipbrokers. Howard Houlder, President of the Institute, who presided, said the new order was viewed with all the more anxiety by shipbrokers because of the serious restrictions already placed upon their business by the requisitioning for Government purposes of something like 80 per cent of the British tramp tonnage in which they dealt. Though a state of war existed they felt it was not incumbent on them, or on any other body of traders, to accept without question or inquiry any Government regulation that was likely to restrict their business. They were entitled to know where they were and where they were going to in this matter. The general body of shipbrokers did not give place to anyone for patriotism. If the need of the country in its day of peril required it, they were prepared to make any sacrifices. From inquiries he had made he had ascertained that the arrangement in question had been entered into by the British Government with the Government of France and Italy. For that reason they should be very cautious as to the action they took, for fear it might make the position of the Government difficult or induce the Allies to believe that they were following a selfish course. What they really wanted was more light in regard to the order. Perhaps if it were clearly understood it would be found to be not so objectionable. He understood, for instance, that there was no intention to prevent brokers negotiating by telegraph with clients, owners of tonnage, in neutral countries. The real object of the Government was to secure control of the amount of shipping they thought requisite for supplying the country with the necessaries of life.

* * * *

It is good to hear, therefore, that one well known firm has offered to complete a standard ship of the kind mentioned in earlier paragraphs at the rate of one every two weeks, while the managing director of a marine engineering establishment declares he can turn out a set of engines for a 7,500 or 8,000 tons steamer at the rate of one set a week.

Freights

The effect of the new order in regard to chartering neutral vessels will do away with a good deal of quite unnecessary competition, and therefore help to reduce rates, which, in many instances, are in need of certain revision in a downward direction. This refers, of course, to the homeward trades, while in the outward coal markets there is a very powerful move towards increasing the maximum rates fixed last year, as under the present arrangement it is very difficult to secure the tonnage necessary to convey all the coal wanted by France and Italy. It is obvious that the task in front of the Shipping Controller is one of enormous difficulty, but the steps taken to accelerate the building of certain large carriers, which would release tonnage in other directions, is not the least hopeful sign in respect of the future. In the meantime chartering is very dull. The movement to take over maize, with the prospect of rice and barley to follow, has checked grain operations, and the River Plate market is largely nominal. In the East the tone is much easier, although the more distant ports maintain the high rates that have been asked for some time past. From the North American ports steamers are wanted on net charter, and as much as $40 would be paid to the French Atlantic, while any vessel able to load at the Gulf ports for the Mediterranean could secure $50 to $55 per ton. For coal, from Virginia to the Plate ports there is a fairly brisk demand, but, although high rates are offered, owners do not respond. There is very little inquiry for cargo space for cotton at the present time, but the berth rates on this commodity have been advanced.

The report of our European correspondent has been deleted this month by the British censor.

MATSON LINE FINANCES

At the recent annual meeting of the stockholders of the Matson Navigation Company the following directors were chosen for the ensuing year: Wm. Matson, John A. Buck, W. M. Alexander, W. P. Roth, A. P. Welch, Wellington Gregg Jr., and A. F. Morrison. The former officers of the concern were re-elected as follows: Wm. Matson, president; John A. Buck and W. M. Alexander, vice-presidents; W. P. Roth, secretary and treasurer; and A. M. McCarty assistant secretary and treasurer. The Matson Navigation Company enjoyed a very prosperous year, and it is expected that their new building, at the corner of Main and Market streets, will soon be started.

The sixteenth annual report of the secretary and treasurer up to December 31st, shows:

ASSETS

S. S. "Enterprise"	$ 122,000.00
"Hilonian"	126,000.00
"Hyades"	146,790.00
"Lurline"	428,000.00
"Matsonia"	1,166,576.00
"Manoa"	689,117.00
"Maui"—Under construction	1,215,366.54
"Wilhelmina"	540,000.00
M. S. "Annie Johnson"	77,551.40
"R. P. Rithet"	95,896.22
Barge "Bennington"	19,000.00
Barge "Mohican"	17,200.00
Tug "Intrepid"	12,200.00
	$4,655,697.16
Real estate, Main and Market streets	326,201.10
Paauhau Sugar Plantation Co stock	300,000.00
Honolulu Con. Oil Co. stock	204,284.40
Hilo investment	20,039.03
Honolulu pipe line	1,000.00
Honolulu wharf equipment	701.00
Office equipment	2,932.65
Wharf equipment	9,552.65
Agency accounts	86,196.65
Advances, ins., taxes, etc.	99,149.12
Freight and accounts collectible	197,959.60
Cash on hand	98,830.88
	$6,002,544.14

LIABILITIES

Issued capital stock, 35472 shares	$3,547,200.00
Bills payable (note)	250,000.00
Sundry accounts payable	137,650.90
Open voyage accounts	39,445.00
Surplus account, December 31, 1916	2,028,248.24
	$6,002,544.14

SURPLUS ACCOUNT

Div. paid during year 1916—123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134	$ 124,152.00
Div. October 1, 1916	1,773,600.00
Balance, December 31, 1916	2,028,248.24
	$3,926,000.24
Balance, January 1, 1916	$2,295,332.32
Profit and loss account, December 31, 1916	1,630,667.92
	$3,926,000.24

The Steamboat Inspection service has modified its recent ruling in regard to the sheating of cargo spaces on wooden vessels and the installation of sprinkler systems. The new rule eliminates entirely the provision for sheathing and provides that all passenger vessels, steel or wood, carrying cargo on the main deck shall be provided with a sprinkler system; also that passenger and crew spaces below deck, unless constructed of non-combustible material (and this question is left to the local inspectors) shall be provided with sprinkler systems. Kitchens and galleys below deck in passenger vessels must also be so provided.

The large fabricating shop at the Sun Shipbuilding Company plant is built in the shape of the letter "H" and arranged for the continuous passage of raw material in one direction.

Builders of Standard Ships

AN interesting new shipyard and one that is planning to secure every economy that can be obtained through building standard sizes and types of vessels and fitting them with standardized engines, is that established by the Sun Shipbuilding Company on the Delaware river.

The controlling interest in the Sun Shipbuilding Company is owned by the Sun Oil Company, whose home office is in Philadelphia, and who operate a large fleet of oil tankers. It is expected that the shipbuilding company will in the future supply a large number of oil tankers to the Sun Company and this can readily be appreciated as an asset of considerable consequence. When the outside demand for tonnage lessens somewhat, the facilities of the concern will immediately be turned to the reinforcement of the Sun Company's fleet, and when the otuside demand is again brisk its efforts will be directed to the accommodation of the needs of others. By such a plan, assuring a continuity of work even and unbroken at all times, the Sun Shipbuilding Company confidently hopes to build up and develop an organization of the highest possible efficiency. The concern proposes to build only three standard types of vessels:

Ten thousand ton, 10½ knot cargo boats with reciprocating engines.

Ten thousand ton, 10½ knot oil tankers with reciprocating engines.

Ten thousand ton, 13½ knot cargo boats with geared turbines.

The Sun Shipbuilding Company was conceived in March, 1916, and at the present time the entire plant is practically completed with machinery set up and in operation, overhead handling equipment in place, steel being fabricated and the keels of the first two vessels have been laid.

The plant is located on the Delaware river at Chester, Pennsylvania, and the site consists of 80 acres with a water frontage of 2,000 feet on deep water. The property lies high and is well drained. The yards are served by three railroad systems, the Philadelphia and Reading, the Pennsylvania Railroad and the Baltimore and Ohio and are located in a section of the country that is well fitted to furnish an abundance of skilled labor. The entire plant is worked out on the principle of balanced production, the raw material being taken in at one end and moved continuously in one direction until it finds its place in the hull of a ship. The fabricating shops have overall dimensions of 540 by 600 feet, and have been built in the shape of the letter "H."

There are five ship ways, built entirely of steel and concrete and fitted to accommodate hulls up to 600 feet in length. Each shipway is provided

Steel work going up on the fine steel and concrete building berths of the Sun Shipbuilding Company.

Another view of the building berths taken January 17, 1917, showing a large electric traveling crane in place.

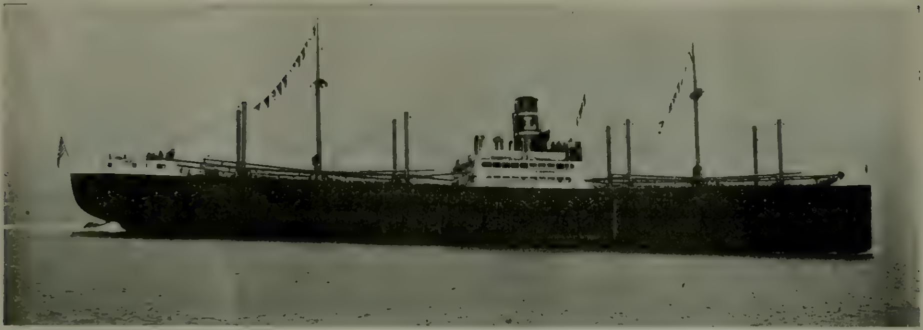
with two overhead cranes having a span of 125 feet and additional facilities are provided for handling material on the ground by a railway track running down each side of each shipway.

The rapid progress in the development of the Sun Shipbuilding Company has been largely due to the acquisition of the well known engine building plant of Robert Wetherill and Company, Inc., which was taken over in its entirety by the shipbuilding company. It would be impossible to overestimate the value of this engine building plant to the Sun Shipbuilding Company. The splendidly equipped shops of the Wetherill concern held an enviable reputation as producers of the highest class marine engine work and machine shops and foundries are admirably adapted to handle the class of work that will be required from them by the shipbuilding plant. Not only has this fortunate acquisition relieved the Sun Shipbuilding Company of the necessity of constructing and equipping large machine shops and a foundry, but it has also given them a high class and capable organization, an asset which it takes tedious years to obtain.

The wet dock at the shipyard is 600 by 200 feet in extent, thus providing outfitting berths for two large vessels, and the wharves are equipped with 100-ton, 100 foot span hammer-head cranes for expeditiously handling and installing machinery and boilers into vessels hulls. A fine new boiler shop has just been completed as it is the intention of the firm to do all its own boiler work. Machine tools will all be driven electrically and for this purpose a 3,000 kilowatt power house has been installed. There is also ample air compressor capacity.

As stated above, the Sun Shipbuilding Company is confining itself to the construction and perfection of three standard types of vessels, each of 10,000 tons deadweight carrying capacity. The management of the concern are strong in their belief that boats of this size are recognized as the most economical and desirable water transportation units today. By specializing on a standard ship and not attempting to follow individual designs the company aspires to realize a high state of efficiency and in this manner build a better boat and possibly, ultimately, at lower cost than would otherwise be possible. Nothing will be left undone that will help to secure a really high-class vessel and just as soon as a new idea has been devel-

A view in the ship tool shed of the Sun Shipbuilding Company. Note the handling arrangement around the large tools and the ample space allowed for feeding material.



The "Julie Luckenbach," the second of a fleet of five big freighters building to the order of the Luckenbach Steamship Company by the Fore River Shipbuilding Corporation.

oped and thoroughly proven it is the intention to embody it in the design of these standard ships. With such a stock ship it will be possible to carry on hand at all times repair parts and spares, so that when in urgent need, the owner need never wait for the casting or forging of some certain part which he might require in haste. The concern further proposes to keep a careful watch over these stock ships while in service, with a view to correcting difficulties which may appear from time to time in the hope that ultimately they will be able to produce a ship that will be as nearly perfect as is physically possible.

"TIDEWATER" LAUNCHING

The single screw collier "Tidewater" was launched at the yards of the New York Shipbuilding Corporation on January 18. The "Tidewater" is a single decked vessel with poop, bridge and forecastle, and is 395 feet 4 inches over all, 377 feet 4 inches between perpendiculars, 55 feet moulded beam and 34 feet 5 inches moulded depth. She has a complete double bottom and peak tanks for water ballast, and will carry 8,600 tons of coal. She is of a similar type to the "Franklin" and "Plymouth," previously built by the Camden concern for her owners, the Darrow-Mann Company. The keel of the "Tidewater" was laid on March 18, 1916, and she was christened by Mrs. Margaret F. Cannon, wife of Henry F. Cannon, president of the Darrow-Mann Company.

Launch of the "Tidewater" at Camden, New Jersey. New York Shipbuilding Corporation photo.

THE "JULIA LUCKENBACH"

The "Julia Luchenbach," pictured herewith, launched December 23, 1916, is the second of a fleet of five large oil-burning freighters building for the Luckenbach's by the Fore River Shipbuilding Corporation. The big craft is for the general cargo trade of the Luckenbach Steamship Company.

Like the other vessels of this fleet, the "Julia Luckenbach" was built to special designs. She is 456 feet over all and has a deadweight capacity of 10,000 tons. In the adoption of the modified cruiser stern, the novel arrangement of bridge and deck-house bulwarks, and the large single stack amidships, she is a handsome vessel of distinctive appearance. Her wide spaced frames are specially designed to facilitate the rapid handling of general freight and the completeness of her cargo handling gear can be seen from the picture herewith.

The vessel is driven by a single Curtis turbine with high and low speed reduction gears designed to deliver 4,000 h. p. at 90 revolutions, the turbines being so arranged that the ahead and reverse turbines are carried on one shaft and contained in one case. Steam is furnished by three boilers of the Scotch marine type, the fuel oil being carried in the double bottom compartments and in the fore and after peaks.

SHIPBUILDING

The Electric Boat Company has accepted a contract for twenty coast defense submarines and one fleet submarine for the United States Navy. The contract amounts to about $17,000,000.

The latest Burmeister and Wain motor ship to be delivered is the 7,000 ton deadweight "Valparaiso," built to the order of the Johnson Line.

The United States battleship "Mississippi" was launched at the Newport News Shipbuilding and Dry Dock Company's plant on January 25. The "Mississippi" will be of 32,000 tons displacement, and will be driven by Curtis turbines of 32,000 horse power. Like all the new naval vessels, she will be fitted for burning oil.

The two largest shipbuilding plants in Hong Kong are extremely busy, their output, however, being somewhat hampered by lack of steel, most of which is brought from the United States. The Taikoo Shipbuilding and Engineering Company has under construction two steel single screw steamers 223 feet long, for the Siam Steamship Company; two single screw steel steamers 293 feet long for Jardine, Mathewson and Company, and four single screw steamers for Norwegian interests. All these vessels are being fitted with triple expansion reciprocating engines. The Hongkong and Wampoa Dock Company has on hand the Suiyang of 2,550 gross tons and 2,000 h. p., and the Woosung of 3,450 gross tons and 1,800 h. p. for the China Navigation Company, and No. 167 and No. 171 of 6,200 gross tons and 3,500 h. p. for the Blue Funnel Line. These vessels also are all equipped with reciprocating engines.

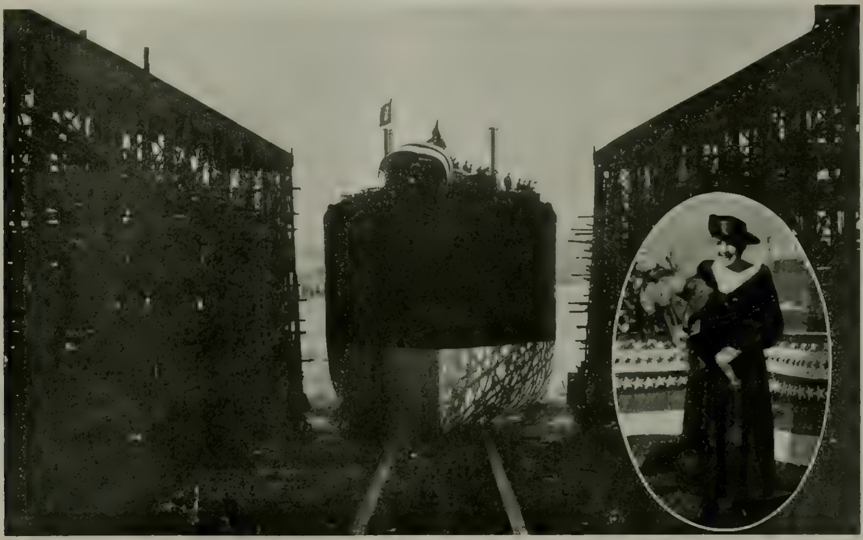
According to the American Consul General at Christiania, the reports published in America that the Norwegian Government had passed a law forbidding the placing of ship contracts abroad were incorrect. What did happen was that the Government made an appeal to the Norwegian banks to refrain from assisting the financing of such contracts.

On December 30, the Slidell Shipbuilding Company of Slidell, Louisiana, launched the "Baltic 1," the first of four sister wooden steamers building at the plant. The vessels are 229 feet long by 44 feet beam, and have 19 feet depth of hold. They will be equipped with 1,000 h. p. triple expansion engines. The "Baltic 1" is the largest steamship ever launched in the United States south of Newport News.

THE "EAGLE" LAUNCHED

The "Eagle," specially built for transporting case oil for the Standard Transportation Company of Delaware by the Union Iron Works of San Francisco, was successfully launched on February 3. The "Eagle" is 410 feet long by 56 feet beam by 33 feet 6 inches moulded depth. She is driven by a triple expansion engine with cylinders 27, 47 and 78 inches in diameter by 48 inches stroke. Steam is furnished by three Scotch boilers and the indicated horse power is 2,600. Mrs. Robert Hague, wife of the naval architect of the Standard Oil Company, christened the "Eagle."

The Pacific Freighting Company, the operating subsidiary for Comyn, Mackall and Company, has purchased the "Hilonian" from the Matson Navigation Company for $450,000.



The launch of the "Eagle" at the Union Iron Works Company's Potrero plant on February 3rd. The insert is of Mrs. Robert Hague, wife of the naval architect of the Standard Oil Company, who christened the "Eagle."

Pacific Coast Shipyards

THE Washington Shipping Corporation, on January 20, launched the large wooden auxiliary schooner "Takoma." The "Takoma" is 250 feet over all by 43 feet beam by 21 feet depth of hold. She is powered with twin 240-horsepower semi-Diesel engines and is for the Pacific Motorship Company of Christiania, Norway.

On January 23, the Skinner & Eddy Shipbuilding Corporation launched the freighted "Luise Nielsen." This fine cargo boat is 410 feet 5½ inches long by 54 feet beam by 29 feet moulded depth and has a deadweight capacity of 8,800 tons.

The Pacific American Fisheries has ordered three 65-foot cannery tenders from the Tregoning Boat Company. These boats are for May 1 delivery.

The Ballard Marine Railroad of Ballard, Washington, has received orders during the past few weeks for several scows and a large cannery tender for Alaskan interests.

The Wilson Brothers shipyard at Astoria launched the steam schooner "Ernest H. Meyer" on January 20. The "Meyer" was originally built for Chas. R. McCormick & Co., but was sold just before launching to Broughton & Wiggins. The vessel is 232 feet long by 40 feet beam and 16 feet depth of hold, and has a lumber capacity of 1,200,000 feet. She will be fitted with a triple-expansion engine of 850 h.p. and 13½, 23 and 40-inch cylinders by 30-inch stroke, built by the Main Street Iron Works of San Francisco. Steam will be supplied by two B. & W. boilers.

The officers of the newly organized Pacific Coast Shipbuilding Co. of Tacoma are: J. H. Hyde, president; E. E. Sherwood, vice-president; F. H. Murray, secretary; C. C. Dowd, treasurer, and L. H. Coolidge, consulting naval architect.

The double-ended steamer "Phyllis," building to the order of Bixby and Clark of San Francisco, was launched from the yards of her builders, the Aberdeen Shipyards, Aberdeen, Washington, early in February. The "Phyllis" is 215 feet between perpendiculars by 42 feet beam by 16 feet 6 inches depth of hold. She will be driven by a triple expansion engine of 850 horse power with cylinders 13½, 23 and 40 inches diameter by 30 inches stroke, built by the Main Street Iron Works, San Francisco.

The Seaborn Shipbuilding Company of Tacoma, Washington, launched the steam schooner "Orcas" on January 20. The "Orcas" is 170 feet long, 35 feet beam and 14 feet depth of hold. She will be fitted with Almy watertube boilers and a compound engine.

The Peninsula Shipbuilding Company launched the second of their auxiliary schooners, the "Beta," on January 27. The "Beta" is 257 feet long over all by 43 feet 4 inches beam. She will be fitted with Winton Diesel engines.

The newly organized Sloan Shipbuilding Yard of Olympia, Washington, of which Philip D. Sloan is president and Joseph A. Sloan chief engineer, has orders for four wooden motorships of 3,200 tons d. w. capacity. The vessels will be 280 feet long by 46 feet beam by 24 feet depth of hold. The plant site at Olympia covers 12 acres.

The Heffernan Engine Works of Seattle has been awarded the contract for the overhaul of the Army transport "Crook." The work includes cutting away the after house and making a well-deck ship of the "Crook"; renewing several shell plates; installing eight cargo winches and four cargo booms and a general overhaul of the machinery. The work is to be completed in 85 days and the contract is for $80,000.

The largest gold placer dredge ever built is rapidly nearing construction at the works of the Yuba Consolidated Company, Hammondton, California.

Schertzer Brothers, who formerly operated a boat building plant on Lake Washington, have moved their location to the Salmon Bay district, Seattle, where they have installed a plant capable of handling construction up to 90 feet in length.

The Overseas Marine Construction Company, which is headed by Patrick J. Donohoe of Seattle, has been clearing off the site of the old Sumner Iron Works at Everett, Washington.

The Elliott Bay Yacht and Engine Company of Seattle, Washington, has received an order from the United States Bureau of Fisheries for two patrol boats for work in northern waters. Martin C. Erismann, a Seattle naval architect, designed the craft and will be in charge of their construction.

The Pacific American Fisheries launched the first of their new wooden steamers, the "Redwood," from their yards at South Bellingham, Washington, on January 22. The "Redwood" is 235 feet long, 42 feet beam and 25 feet 9 inches depth of hold. She will be fitted with a 1,000 horse power triple expansion engine built by the Seattle Machine Works. Steam will be supplied by two Scotch boilers. A sister ship, the "Firwood," will be put overboard during the early part of March.

The Hart-Wood Lumber Company let a contract on January 19 to the Mathews Shipbuilding Company of Hoquiam, Washington, for a wooden auxiliary schooner 200 feet in length.

A 16,000-ton floating dry dock is to be built at Vancouver for the Vancouver Dry Docks Company. It is understood that a shipbuilding and repair plant is also contemplated.

The British Columbia Packers have ordered a halibut boat from the W. R. Menchion Shipyard of Vancouver, B. C. The boat will be 65 feet long, 15 feet beam and 7 feet draft, and be powered with a 50 h. p. gasoline engine. She will go into commission about April 1.

The Vancouver Shipyards, Ltd., have two 76 foot fishing boats for the Columbia River Packers well under way. These craft are unusual in that they have 'tween decks in order to avoid heavy stacking of fish. One will have a 90-h.p. and the other a 110-h.p. gasoline engine.

The Seattle Port Commission's new ferry, "Robert Bridges," after waitng on the stocks for several months awaiting her machinery, was launched at the close of January. She is 100 feet long by 38 feet 8 inches beam and draws 8 feet of water. She will be fitted with Southwark-Harris Diesels and went into commission in February, taking the place of the old ferry, "West Seattle," which will be sold. The new craft is from the designs of Lee and Brinton.

The United States submarine N-3 was successfully launched at the yards of the Seattle Construction and Dry Dock Company on February 21.

The "State of Oregon," a big wooden motorship, building for the State Line by the Alaska-Pacific Navigation Company's Seattle plant, was launched on February 17. The "State of Oregon" is 216 feet long by 42 feet beam by 23 feet 7 inches depth of hold, and will be fitted with Southwark-Harris heavy oil engines.

The Mark Johnson Yards at Leschi Park, Lake Washington, Seattle, has secured a contract for a 65-foot cruiser for N. W. Starret. Lee and Brinton of Seattle are the designers. An 80-h.p. gas-engine will be fitted.

Libby, McNeil and Libby have let a contract for a second auxiliary schooner to the Standifer-Clarkson Company of North Portland. The craft will be 220 feet long by 43 feet beam by 21 feet depth of hold, and will be powered with twin 240-b.h.p. Skandia oil engines and a 50 h. p. Skandia engine to furnish power for winches, windlass, steering gear, electric lighting, etc. Delivery is called for on December 1, 1917.

It is understood that the Standifer-Clarkson yard has also secured an order, through Cox and Stevens of New York, for a large single-decked carrier propelled by oil engines, to be 280 feet long by 45 feet beam by 25 feet depth of hold.

The Cameron-Genoa Mills Shipbuilders, Ltd., launched the auxiliary motorship "Margaret Haney" on February 3. The vessel is a five-masted schooner in rig, is being built to the order of the Canada West Coast Navigation Company, Ltd., and will be delivered about the first of April. She will be equipped with two 160 h. p. Bolinders.

The Supple Shipyard at Portland is now ready to lay its first keel. The mould loft and other buildings are well along and this plant promises to take an important place among the Columbia river concerns during the present year.

The old Seattle Dry Dock Company has been reorganized as the Sloan Shipyards Corporation, and Mr. Philip D. Sloan, president of the new organization, has announced that the firm has eight motorships to build for Eastern capitalists. These vessels will be 280 feet long by 46 feet beam outside planking by 24 feet moulded depth. Four of these craft are to be delivered before the end of the year. They will be powered with 500 h. p. Polar Diesel engines. The shipyard is being rapidly completed, and is located at Olympia, Washington.

Owing to the very large demand for steel lifeboats, the George W. Kneass Company of San Francisco has recently installed and equipped a complete steel boat building equipment. In the Kneass steel boats the air tanks are built in athwartships and form the thwart for the rowers. The keels, bow and stern piece are cast in one piece, and the boats are all made to templates.

The Supple, Ballin and Lockwood Shipyard at Portland will build two composite hulled motorships for Eastern interests. The vessels will be equipped with twin 300 h. p. Winton Diesel engines. The hulls will be liberally strengthened with steel at the points of maximum strains and stresses.

It is understood that Chas. R. McCormick and Company are considering the installation of machine shops at the St. Helens Shipbuilding Company plant.

Work has started on a new shipyard at Aberdeen, Washington. The plant is located between the Grays Harbor shipyard and the Western Mill, and has 600 feet of good water frontage. Keels for two large auxiliary vessels will be laid as soon as possible.

The Lanteri Shipyard at Pittsburg, California, will launch the hull of the new Martinez-Benecia ferryboat on March 6. The craft is 165 by 34 by 14 feet moulded. She will be a side wheeler and will be equipped with horizontal compound engines by C. H. Evans and Company of San Francisco.

The shipyard of the Temple Shipbuilding Company at Port Blakely, Washington, is just about completed and the concern expects to lay its first keel during the present month.

Active work is under way on the Todd Dry Dock and Construction Company at Tacoma, and dredgers have been busy along the water front of the site for some time. It is understood that

Mr. C. W. Wiley, head of the Seattle Construction and Dry Dock Company, which was acquired by the Todd interests some time ago, will also head the big new Tacoma shipyard.

The steam schooner "Phyllis," building by the Peterson Shipyard, Aberdeen, Washington, for W. R. Chamberlin and Company of San Francisco, was launched on February 7.

The James Robertson Shipyard at Benecia, California, which was somewhat damaged by fire in February, has received from Andrew F. Mahony of San Francisco an order for a third auxiliary schooner. The new craft will be 270 feet long by 47 feet beam by 23 feet moulded depth.

The auxiliary schooner "Margaret" was launched from the plant of the McEachern Ship Company at Portland on February 17. The vessel is building for the A. O. Anderson fleet and is 250 feet long over all by 42 feet beam by 21 feet moulded depth. She will be driven by twin 240 brake horse power Skandia engines and will have a 75 horse power Fairbanks-Morse oil engine for driving the lighting plant and deck machinery.

The Alaska-Pacific Navigation Company launched the motorship "Oregon" from their Seattle yard on February 17. The "Oregon" is 216 feet long by 42 feet beam by 23 feet 7 inches moulded depth. She will be powered with Southwark-Harris oil engines.

The Skinner and Eddy Corporation, Seattle. intend to launch the first of a pair of big tankers building for the Standard Oil Company of New Jersey during March. The vessel is 420 by 57 by 31 feet 6 inches moulded, and has a capacity of 65,000 barrels. She will be propelled by General Electric Curtis geared turbines.

The Johnson Brothers and Blanchard shipyard which is being operated by the National Shipbuilding Company of Seattle, launched an 86-foot cannery tender on February 19th.

The Western Shipbuilding Corporation of Seattle, which has taken over the partially completed plant of the Peoples' Shipbuilding and Construction Company of Tacoma, which is situated at Gig Harbor, is capitalized at $500,000, and it is understood has two contracts on hand. Mr. A. B. L. Gellermann of Tacoma is temporarily president of the Western Shipbuilding Corporation, and has opened offices in the Burke Building, Seattle. Mr. G. C. Lemcke is secretary and general manager, while Captain W. H. Varney will be in active charge of construction work.

The Rolph Navigation and Coal Company of San Francisco has ordered two 135 foot ocean-going steel tugs from the Union Iron Works Company for use in towing ocean-going barges. The tugs will be very powerful boats.

PERSONALS

Some of the new shipbuilding plants have been quite successful in securing the services of experienced and able men. The Ames Shipbuilding and Dry Dock Company presents a good example of this fact. Mr. D. Hollywood, their general manager, served his time in Harlan and Wolf's at Belfast; was for three years general superintendent of the Hongkong and Kowloon Dockyard Company, at Hongkong; for two and one-half years assistant superintending engineer for Alfred Holt at Birkenhead, England; for six and one-half years manager of the J. T. Heffernan Dry Dock Company at Seattle, and three and one-half years as dockmaster and superintendent of repairs with the Seattle Construction and Dry Dock Company.

Mr. John Wilson, the General Superintendent of the Ames plant, was for many years with Townsend and Downing and for twelve years operated a yard of his own in Seattle. Mr. R. J. Wright, the Superintending Engineer, held executive positions for many years in the Erie Basin, Morse Dry Dock and Repair Company and with the Seattle Construction and Dry Dock Company. Mr. H. Wharton, the Superintendent of Steel Construction, was with the Cramps Shipyard for thirty years (nine years superintendent of steel construction), and later with the Seattle Construction and Dry Dock Company and the Alameda branch of the Union Iron Works Company.

Mr. Raymond B. Stevens, a New Hampshire man, was appointed to the Federal Shipping Board during the early part of February, to fill the vacancy caused by the resignation of Mr. Bernard N. Baker.

General Manager Comfort and Dalton Mann of the Pacific Mail Steamship Company acted as hosts on February 9th at a delightful luncheon to newspaper men, served in the handsome dining room of the steamer "Ecuador." The handsome public rooms of the "Ecuador" lend themselves very readily to entertaining, and Messrs. Comfort and Mann were showered with well-deserved compliments on the ship, the service and one of the best appointed luncheons ever given along the waterfront.

After twenty-four years in the steamship business, Mr. A. N. Floyd, general agent of the freight traffic department of the Pacific Steamship Company in Seattle, tendered his resignation to that firm, to take effect on March 1. Mr. Floyd will become associated with the Noosack Packing Company of Portland, Oregon, a concern which operates a large salmon packing establishment on Lummi Island. Floyd was a San Francisco man, and started his career with Goodall and Perkins in 1893. He was also with the Boston-Alaska Transportation Company, the Alaska Commercial Company, the Alaska Exploration Company, the Northern Commercial Company, the Pacific Coast Steamship Company, and finally with the Pacific Steamship Company.

Another resignation that will cause unbounded interest along the coast is that of Mr. B. L. McMullen, general freight and passenger agent of the Border Line Transportation Company of Seattle. Mr. McMullen will enter the ship chartering, buying and selling business for himself at the first of the present month. McMullen has been connected with transportation for the past seventeen years. He served with the Pennsylvania, Wabash and Great Northern Railways in 1908, came to Seattle and entered the service of the American-Hawaiian Company. Later he joined the Dodwell company and was a member of their staff until 1911. In 1913 the Dodwell interests organized the Border Line Transportation Company, and Mr. McMullen was placed in charge of traffic, and when the concern absorbed the Northland Steamship Company Mr. McMullen became general freight and passenger agent.

Mr. C. Holdsworth, managing director of the Union Steamship Company of New Zealand, spent the major portion of February in San Francisco in connection with the business of the steamship concern in this port.

Mr. B. F. Watson, one of the best known among the younger steamship men on the Coast, resigned his position as general agent of the Pacific Steamship Company in Alaska on February 1. He entered the service of the Alaska Navigation Company in Alaska in 1908 and at various times was stationed at Los Angeles, Seattle, Cordova, Valdez and Seward.

Mr. R. V. Ross of the freight traffic department of the Pacific Steamship Company resigned from that concern on March 1. Mr. Ross intends to follow the steamship game once more after taking a well earned vacation.

Mr. J. E. Bowles, President of the Northwest Steel Company, is in New York on business connected with the possible signing up of further contracts for the big Portland shipbuilding concern. Mr. Bowles left Portland for the East February 10.

Mr. R. S. James has been appointed general agent of the freight department of the Pacific Steamship Company to take the place of Mr. A. N. Floyd, who resigned to take up other work. Mr. L. W. Baker has been appointed to take the place in the same concern vacated by Mr. R. V. Ross.

Mr. Joseph B. Weaver, formerly superintendent of hull construction at the yards of the Newport News Shipbuilding and Dry Dock Company, has become vice-president and general manager of the Harlan and Hollingsworth Corporation, Wilmington, Delaware.

Mr. Arthur Arlett has been appointed as a State Harbor Commissioner to fill the place vacated by the resignation of Mr. J. J. Dwyer. Arlett is well known in the political world as well as in business affairs, and has been a close friend of the California Governor's.

Mr. J. H. Pillsbury, superintendent of the Dominion Dry Dock at Prince Rupert, is at present engaged in gathering together a staff and making purchases with the end that the new Prince Rupert shipbuilding and repair concern will shortly be in a position to undertake new construction both in wood and steel as well as drydocking and repair work.

Mr. Alfred Greenebaum has been appointed to the San Francisco Board of Pilot Commissioners by the Governor of the State.

At the recent annual banquet of the San Francisco Yacht Club, the retiring commodore, Captain John Barneson, was presented with a handsome loving cup. Officers for the present club year were elected as follows: Vice-commodore C. E. Miller was elected commodore; E. R. Polheums, vice-commodore; Philip J. Fay, treasurer; Frank M. Garden, secretary; Wilfred Page, financial secretary, and Carl Rhodin and Captain John Barneson directors at large.

The Sloan Shipyard Company of Olympia has let a contract for the construction of 1,200 feet of railway and the driving of about 7,000 piles for building berth and wharf foundations.

The suits arising from the collision of the "Strathalbyn" and the "Virginian" have reached a final settlement, according to satisfaction of judgment papers recently filed in Tacoma with the Federal court. The American-Hawaiian Steamship Company paid the "Strathalbyn" $88,925.50 in settlement of judgment and $23,577 in settlement of cross libels.

According to an announcement made by Mr. C. W. Jungen, general manager of the Southern Pacific's steamship line, the Morgan Line, extensive additions to the fleet as well as much new terminal work is either now or will soon be under way. Plans have been approved for five large steel and concrete piers at Galveston, three new steamers will go into commission during the coming summer, and the construction of six new vessels has been authorized. Four of the new craft will be 11,000 ton deadweight freighters for the New York-Galveston route and the other two 10,000 ton passenger ships for the New York-New Orleans run.

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THE FEDERAL SHIPPING BOARD

In a letter to President Wilson, made public on February 11, Chairman Denman requested that the idle army transports be turned over to the board for use in the coast to coast trade through the Panama Canal. The letter sets forth the scarcity of tonnage on this route due to the withdrawal of vessels on more profitable charters and trades. The board seeks to obtain the control of the obsolete army transports which the War Department has been authorized to sell. These are the "Crook" of 4,800 tons, now being used in connection with the Alaskan railway, and the Meade of 5,526 tons, which has laid idle at Newport News for a good many years.

That it would be a good thing for the Shipping Board to put on several ships running between the Atlantic and Pacific seaboards pending the return of the regular lines to this service there can be no doubt, but the placing of such vessels as the "Meade" and "Crook" on this long run is rather questionable. The "Meade" was formerly the Atlantic liner "City of Berlin," and was built by Messrs. Caird, of Greenock, in 1875, thus being in her forty-second year. She is 488 feet 6 inches long, 44 feet 3 inches beam and 34 feet 9 inches deep, hardly the dimensions for an economical cargo boat. She was originally provided with a vertical compound engine with cylinders 72 and 120 inches in diameter by 66 inches stroke. In 1887 she was fitted with triple expansion engines by the Lairds of Birkenhead and also with Howden's forced draught. She was bought by the U. S. Government for transport service during the Spanish-American war, and was laid up shortly after that unpleasantness was over.

The placing of a vessel of this type and age on important freight route would hardly constitute a good example for the American shipowner to follow.

THE SEAMEN'S ACT AGAIN

When the Seamen's Act became law its proponents were insistent that shipowners, publicists, politicians and, in fact, everyone who could have any interest in either its success or failure should cease damning it or praising it and accept the inevitable with good grace. Perhaps that was the proper view to take of the matter, but it is evidently not the standpoint adopted by either Mr. LaFollette or Mr. Furuseth, the two gentlemen who were largely instrumental in fighting the measure through Congress.

On January 23, 1917, Mr. LaFollette presented two documents to the Senate from the pen of Mr. Andrew Furuseth, entitled: "The Seamen's Act, a protest against the construction of section 13 of the Seamen's Act as promulgated by the Department of Commerce" and "Watch and Watch at Sea, a protest from the International Seamen's Union and a warning to shipowners."

The documents mentioned above are highly interesting collections of data, affidavits, etc., and prove that certain hazy sections of the Seamen's Act have not been interpreted at all to the satisfaction of the Seamen's Union. In his conclusion in the first pamphlet mentioned, Mr. Furuseth states:

"The facts herein set forth are presented to Congress for the reason that all efforts to obtain, through the Department of Commerce, a correct interpretation and administration of section 13 of the Seamen's Act have been futile.

"Congress enacted that section to protect the lives of those going to sea from American ports, and to make it impossible to operate ships out of ports of the United States with men unable to understand the orders of the ship's officers.

"Because of the manner in which it has been construed and the failure of the Department of Commerce to enforce it United States, English, Holland, and Norwegian ships are departing the ports of the United States manned by lascars and Chinese. Ships even in the coastwise trade are manned by men unable to understand the officers, and the conditions in this respect are even worse than before the passage of the Seamen's Act."

We always maintained that section 13 of the Seamen's Act would never accomplish what its framers desired, namely, the abolishment of Oriental crews, and it now appears that its sponsors are being forced into the same opinion.

UNEASY LEGISLATION

It is rather easy in these days and times to rush into frenzied legislation. The Alexander Shipping Bill, H. R. 20,800, providing that all vessels constructed in the United States must belong to American citizens is a worthy example of the many misdirected efforts arising out of the strained relations between this country and Germany.

If the American shipbuilder has any chance whatsoever to lay the foundations for an industry that can continue to build ships for export after the return of normal conditions, he should certainly be encouraged to pave the way at the present time with this ultimate end in view. It is true that the tonnage building in American yards for foreign owners has assumed quite large proportions, but it is also true that the percentage of the whole tonnage building that is destined for foreign ownership is by no means alarming.

The building of ships for our neighbors is not a business that can be taken up or set aside at will. The business msut be a steady one, or it will not exist. At the present moment our activities on foreign owners' accounts are nothing more nor less than "war orders," and certainly if we do not try our best to satisfy Norwegian and other owners during a time of urgent necessity, they will feel no compunction about giving us no opportunity to compete on their work when times are normal once more. Again, why should the shipbuilding industry be prohibited from exporting its output while all other industries are at liberty to do as they please with theirs?

Of course, there is always the possibility of a national crisis and a sudden demand from the Government for everything in the shape of a ship that is building or in service. Such a condition warrants confiscation of ships or anything else, but such a condition is a long ways from existing today.

IS THE STEAM ENGINEER DECADENT?

"The Motor Ship and Motor Boat" of January 11, 1917, contains an unusual article under the caption "A New Type of Marine Engineer—The Engineer of the Motor Ship versus the Mechanic of the Steamer." The gist of this article is summed up in the sentences:

"In a word, an engineer's work on a steamer is uninteresting on the whole, does not need the exercise of brains, tends to the atrophy of all initiative, and leads to the degenerate equalization of all engineers—good, bad and indifferent. On a motor ship the position is different. Such troubles as arise in internal combustion engines, and particularly in Diesel engines, are seldom purely mechanical, to be seen immediately they arise. To discover their cause, a trained mind has to be brought to bear upon them, and there is every scope for the use of brains, as well as, or in most cases instead of, the hands. A pure mechanic without originality or much brain power, who could keep a steam engine running for ever and could locate and repair faults as well as, or better than, a man with a far better engineering training than himself, is at once handicapped when he comes to deal with problems affecting the Diesel engine."

This article proved highly interesting to us on account of its originality. We must confess that we have never read anything just like it before. Here on the Pacific Coast we have quite a goodly number of craft propelled by internal combustion engines, ranging from the gas boat to the motorship with full Diesel engine drive, and in nearly every case it will be found that the craft is being successfully operated by one of these poor, weak-brained, mechanically inclined steam engineers.

To again quote the article in "The Motor Ship and Motor Boat": "The typical opinion of the average captain and deck officers of a steamship concerning the engineers is well known. I have myself frequently heard them described as engine drivers, with every indication of contempt."

Of course we cannot doubt what the gentleman who wrote this article says he has heard, but had he stepped below and asked the engineering officers what they thought of the deck officers, he might have had his contempt doubled.

The steam engineer, whether he be on a big passenger liner or a rusty, ill-kept tramp steamer, has, as a class, always been noted for his versatility, skill and ability to turn his mechanical ingenuity along the line of least resistance when he finds his machinery in a tight place. American marine engineers are, with but a few weeks study and training, securing certificates to run Diesel engines as well as steam engines, and to refer to them as passing into "degenerate equalization" may be a joke, but it certainly is not on the marine engineer.

The Seamen's Act was recently upheld by Federal District Judge Ervin sitting in Mobile, Alabama. The Court ruled that men in the crew of the Russian bark 'Imberhorne" were entitled to full pay and discharge at Mobile, as they asked, without deduction. The contention of the Russian Consul that law was at variance with a Russian-United States treaty was denied.

We are indebted for the front cover this month to Cardinal Vincent Co. of San Francisco.

Shipping Notes

A GASLIGHT and whistling buoy is to be placed off the Grays Harbor bar and a gas buoy inside. This will enable mariners to make Grays Harbor at night.

The Town Cut Channel at St. George's, Bermuda, was officially opened on January 1, with 21 feet 6 inches of water in the channel at mean low water. Work will progress until 28 feet of water is obtained.

The particulars given out by Lloyds on ship sales during the last quarter of 1916 has some noteworthy examples of the remarkable prices being paid for tonnage. The "Kaifuku Maru," built in 1892, sold in 1907 for $43,798, and was resold in 1916 for $729,975. The "Hercules" was built in 1903 at a cost of $210,000, sold in 1904 for $161,250, and resold in 1916 for $1,300,000. The "Gozan Maru," built in 1898, sold in 1913 for $122,500, brought $875,000. The "Miaoulis," built in 1893, sold in 1905 for $75,000, in 1907 for $77,500, and recently for $592,500.

According to the "Panama Canal Record" of January 10, the total tonnage passed through the Panama Canal from June 30, 1914, to December 1, 1916, was 11,104,722 tons of cargo and the operation and maintenance of the canal during this period amounted to $13,976,249.85, or a cost per ton of $1.25858. The cost of moving a ton of freight through the canal in October, 1916, however, was only $0.82012, so that it may be expected that the average will gradually decrease as slides and interruptions become less frequent.

It is understood that there is a strong movement on foot among a section of the holders of Nippon Yusen Kaisha stock to have the capital stock of that concern raised from $22,000,000 to $44,000,000 by means of the surplus profits. Some of the stockholders want the capital stock raised to $50,000,000 by means of a 100% stock dividend and the selling of $6,000,000 in stock to the general public.

The directors of the American Transatlantic Company, a New York concern, declared a 30 per cent dividend on their $2,500,000 of stock during January. This concern acquired eleven ships and brought them under U. S. registry. Subsequently four of the ships were seized and taken to British ports to await the decision of the prize court. The remaining seven ships have been operating in the Mediterranean and South American trades with marked success.

The W. W. Carre Company, lumber exporters of New Orleans, has started a line of freighters to the West Indies and the northern coast of South America. The concern has purchased the motorship "June," and chartered the steamers "Bowdoin," "Fort Morgan," "Olympic" and "Wellesley," and the motorship "Ruby." Deck space will be utilized for the concern's own lumber shipments, while the holds will be given over to general cargo.

On first of February a general raise in dry dock rates amounting to 12 cents per gross register ton for the first day and from 8 to 10 cents per ton for ensuing days, went into effect at New York dry docks.

VENEERED PANELS ADVANCE

The new price list issued by White Brothers show a uniform advance in the prices of Wybro panels. These advances were inevitable in view of the advanced prices on glue and veneers and the higher wages paid to labor. The prices are in effect the first of the present month. White Brothers, who have long been recognized as the leading hardwood dealers on the Pacific Coast, have now brought out what they term Wybro-Board, a general utility panel which has much to recommend it in the way of durability, appearance and non-checking qualities as well as low price.

Captain Alex Woodhouse of San Francisco recently purchased the old bark "C. D. Bryant," and is refitting the vessel presumably for service in the off-shore lumber trade.

Pacific Coast Activities

SAN FRANCISCO

On the first of the year the Oliver J. Olson Company became Oliver J. Olson and Company, Mr. John C. Settle being the new partner. This firm is handling steamship agencies and carrying on a chartering, buying and selling business in both steam and sailing vessels.

A joint banquet of the Mare Island and Golden Gate Branches of the American Society of Marine Draftsmen was held in the Palace Hotel, San Francisco, on January 20, about 75 of the members of the two branches being present. Mr. Brown, chief hull draftsman, and Mr. Folmer, chief engine draftsman at the Mare Island Navy Yard, were present as guests. Mr. Gibbons, president of the Mare Island Branch, presided at the banquet and Mr. Englebrecht of the Golden Gate Branch made an admirable toastmaster. The entire affair was most successful, and the draftsmen are planning to make it the forerunner of a great number of just such gatherings.

Another firm of San Francisco insurance brokers has entered the average adjusting field. Shortly after the first of the year the well known firm of C. B. Sloan and Company announced the addition to their organization of a marine and average adjusting department. This branch of their business will be in charge of W. W. Tomlinson. In securing the services of Mr. Tomlinson, C. B. Sloan and Company have added to their staff one of the best known adjusters on the Pacific Coast, as he has had many years of experience in this line, his activities having covered the Coast from Punta Arenas to Nome. C. B. Sloan and Company are located in the Crocker Building, San Francisco.

The steam yacht "Cyprus," formerly owned by Col. D. C. Jackling, and sold by him to New York interests, has been resold to the Russian Government, and will be refitted at Fore River at a cost of about $90,000. She will be used as a scout cruiser.

SEATTLE

Establishment of a harbor of refuge near the mouth of the Straits of Juan de Fuca is being urged by the Seattle Chamber of Commerce and Commercial Club.

Mitsui and Company plan to send two large steamers from Seattle to India in the spring. The "Amogisan Maru" sails during March direct for Bombay, and the "Niels Nielsen" sails in May for Bombay and Calcutta. On both voyages lumber and steel products will make up the bulk of the cargo.

The important Japanese shipping and commercial house of Suzuki and Company have opened branch offices in Seattle, making this port their headquarters for the Pacific Coast. The concern has eight steamers on charter which transact a general trading business, and are having several steamers built at the Harima Dockyards of Owe and by the Mitsuibishi at Nagasaki. These new steamers are intended, it is believed, for regular Seattle-Oriental service.

John Graham of Seattle has sold the motorship "Kuskowim River" to C. A. Burckhardt, president of the Alaska-Pacific Navigation Company, and P. O. Burckhardt, vice-president of the Alaska-Pacific Fisheries. The former engines will be removed, and the engines and boilers from the old U. S. torpedo boat "Fox" will be installed. The "Kuskowim River" will be sent north during the present month.

Alaska's commerce for 1916 amounted to $110,368,778, as compared with $73,573,384 for 1915, an increase for the year of 50%. Copper easily leads the field in point of growing importance, showing an increased production of $23,000,000. In the movement of this rapidly growing commerce, Seattle takes the leading part, thus deriving the major portion of the benefit.

The heavy trans-Pacific freight offerings has caused the Osaka Shosen Kaisha to use "extra" freighters on the Seattle-Oriental route, and, in consequence, Puget Sound is seeing some of the big Japanese lines new boats. The "Siam Maru" came to the Sound on her maiden voyage late last year, and the "Burmah Maru" is expected on her first trip in April. These boats, as their names imply, were built for the Japan-India service of the Osaka Shosen Kaisha.

The Seattle Construction and Dry Dock Company has secured a contract for eight wooden hulled motorships 280 by 46 by 24 feet in moulded dimensions. Four of these vessels are to be completed during the present year, and the others in the Spring of 1918.

The Transpacific Navigation Company will have its first Oriental sailing on March 24, when the steamer "Ataka Maru" leaves Seattle for Yokohama and Kobe. Mr. A. M. Gillespie, with offices in the Arctic Building, Seattle, is in charge of the affairs of the new concern.

The Northwest Trading Company, a powerful Seattle commercial concern, has leased the twenty-eighth floor of the L. C. Smith Building, the move being caused by the need of larger quarters. This firm has branch offices in Chicago, New York, Glasgow, Kobe, Hongkong and Amsterdam.

On February 10, the Alaska Engineering Commission opened bids on two sea-going barges for use between Puget Sound and Anchorage, Alaska. The McAteer Shipbuilding Company bid $89,800 on the two barges, and the National Shipbuilding Company $104,000.

H. F. Ostrander and Company have chartered the new Japanese freighter "Somedono Maru" for service between Seattle and the Orient.

TACOMA

A resume of the report of Mr. W. G. Rowland, Tacoma's Harbormaster, for 1916, presents features of unusual interest. Both the import and export registered tonnage stands at 4,335,564 tons, the imports being valued at $105,039,748 and the exports at $107,349,871, or a total of $212,389,619 in commerce. The total of imports and exports for 1915 was $94,251,610; the incerase of 1916 over 1915 being $118,138,009, or 125 per cent. A few of the principal items of import for the year were: Logs, 275,115,210 feet, valued at $2,251,958; ores, gold, silver and copper, 309,438 tons, valued at $37,788,961. Among the exports are cotton to the value of $13,361,993; explosives, $41,012,113; flour, 556,935 barrels, valued at $3,195,502; iron and steel products and machinery $10,329,687; lumber to foreign ports, 145,390,389 feet, valued at $1,766,607, and cigarettes, $8,136,642.

Several steamers building at the Kawasaki Dockyard, Kobe, Japan, have been sold to British interests. The prices paid fluctuated from $200 to $215 per deadweight ton. Thus the price of freighters have reached a point seven times as high as the rock bottom price for tramp steamers during dull times.

PORTLAND

One of Portland's launchings for the month of March will be the "Juana Caste," an auxiliary schooner building at the yards of the Columbia Engineering Works to the order of M. T. Snyder of New Orleans. The "Juana Caste" is the smaller of several schooners building at this plant for Mr. Snyder, her dimensions being 160 feet long, 36 feet beam and 14 feet moulded depth.

Messrs. Fred A. Ballin, J. B. C. Lockwood and Joseph Supple are rapidly working their new shipbuilding plant into shape. Two contracts are on hand from the Gaston, Williams and Wigmore Steamship Corporation of New York. The vessels will be unique in many ways, being the largest wooden deadweight carriers yet attempted on the coast. They will have considerable steel worked into their structures, following ideas which Mr. Ballin has carefully worked out as the result of many years of actual experience in building large wooden craft on the Great Lakes and elsewhere. The combination of the three gentlemen mentioned above is an extremely strong one from a shipbuilding and engineering as well as from a business standpoint, and this new Portland yard should meet with a large measure of success.

Mr. Daniel Kern of the Columbia Contract Company and Mr. John Kiernan of Portland have had a vessel designed by Mr. J. H. Price, late of the St. Helens Shipbuilding Company, and intend building her on a shipyard site on the West Side between Market and Mill streets, Portland. The vessel will be 230 feet long on keel, 242 feet overall, 44 feet beam and 17 feet depth of hold. She will be double diagonal planked and fitted with 1,000 horse power, the engine being amidships. There will be two large hatches forward of the midship house and one aft. The building site selected is large enough to accommodate three berths. Mr. I. N. Day, manager of the Oregon Independent Paving Company, will have charge of the yard.

The Interocean Trading Company of San Francisco has ordered the hull for a 269 foot wooden steam schooner to the Standifer-Clarkson shipyard.

The Columbia Transportation System is the name of a new concern backed by Eastern capital and formed for the purpose of placing a large fleet of all steel carriers on the Columbia and Snake rivers for passenger and freight service, extending from Lewiston, Idaho to Astoria. Mr Wallace R. Struble is carrying on negotiations and preliminary work at Astoria, which will be the terminus of the projected lines.

The Scandanavian-American Shipbuilding Company has secured contracts for two large motorships of the usual Pacific Coast schooner rig type for Eastern interests.

Portland's Latest Yard

THE entrance of Joseph Supple, Portland's pioneer shipbuilder into competition with other deep water shipbuilders was the feature of the past month's news on the Columbia River.

Joseph Supple, builder of over 100 river steamers, and noted from San Diego to Nome for this work, is to build a composite vessel of wood over steel frames, the planking to be double diagonal.

Associated with Supple in his venture will be F. A. Ballin and J. B. C. Lockwood, two well known naval designers and engineers.

A yard site in the centre of the east side has been selected, it being the place where the Standard Box and Lumber Co. stood up to the time of the fire two years ago. A modern shipyard with four ways, a moulding loft 80 by 200, and machine shops equally as large is being built.

The vessels to be built will be the largest of their kind ever built on this coast. They will be 4,000 tons deadweight capacity, schooner rigged and equipped with twin Winton semi-Diesel engines.

Gaston Williams & Wigmore of Dover, Del., are the buyers of the vessels.

Doubling of the capacity of the plant of the Peninsula Shipbuilding Co. from four ways to eight and possibly 10, and the construction of vessels of the same type as the Supple craft was also announced.

The Peninsula Shipbuilding Co. is building five auxiliary schooners of which the "Alpha" is in the water and the "Beta" will follow shortly. F. C. Knapp, head of the plant, is on a business trip in the East in connection with the expansion.

Daniel Kern, head of the Columbia Contract Co. and builder of the two jetties of the mouth of the Columbia River, has decided to build some steamers for his own use. The "John Kiernan" is the first to be laid down, plans for a yard just south of the Hawthorne Bridge having been completed. The "John Kiernan," designed by John H. Price, is to be a double-ended steam schooner, 242 feet over all, 44 feet beam and 17 feet depth of hold. The engines of the "Samson," 1,000 horse power, will be placed in the craft, and a towing machine to enable her to tow barges as well will be installed. I. N. Day will be the superintendent of the yard.

Daniel Kern also announced the sale of two barges, No. 38 and 39, to the Washington Tug & Barge Co. of Seattle. The craft were used in towing lumber to Alaska last summer and before that engaged in placing the rock in the north and south jetties at the mouth of the river.

The steamer "E. H. Meyer," which was to have been known as the "Latourell" and become a member of the McCormick coast fleet, was sold the day before her launching to Broughton & Wiggins. She was launched at Astoria, Wilson Brothers' plant, late in January. The craft will be towed to San Francisco for engine installation shortly.

Williams Conrfoot, head of the Albina Engine & Machine Works, returned from the East recently where he had endeavored to hurry shipments of steel for the six Norwegian and Danish steamers he is to build. He found the Eastern steel mills all holding hundreds of tons of steel on hand, unable to ship through lack of cars. The railroads, however, appeared to be gaining on their deliveries and hope, if no bad weather bothers them, to keep the Pacific Coast yards fully supplied.

The Scandinavian-American Shipbuilding Co., which was incorporated here a short time ago, has taken an option on a site on the west side of the river above the bridges, and hopes shortly to announce contracts for at least two vessels.

Libby, McNeill & Libby placed an order during the month with Standifer-Clarkson Co. for a second motorship, this one to be 260 feet over all, instead of 240, as ih their first one.

The motorship "S. I. Allard," launched at St. Helens late in January, is now at San Francisco, being fitted with engines. She is a sister ship of the "City of Portland," and will return here for a lumber cargo when completed.

FIREMAN'S FUND
Insures Hulls, Cargoes,
HEAD OFFICE: CALIFORNIA AND SANSOME

JOSEPH HADLEY, European Agent
3 LOTHBURY, E. C.
LONDON

G. KIRKHAM SMITH, Special Agent
407 LEWIS BUILDING
PORTLAND, ORE.

FRANK G. TAYLOR, GENERAL AGENT FOR WASHINGTON, OREGON, ALASKA

Limitation of Liability

Bill of Lading Provision for "Benefit of Insurance"

A CASE, interesting alike to shipowners, time charterers, shippers and underwriters, was recently decided in the Circuit Court of Appeals, second circuit, and incidentally in the trial of the case in the lower court some illuminating references were made to the practice of underwriters in cases where the bill of lading provides that the carrier shall have the benefit of any insurance there may be on the goods.

The steamer "Julia Luckenbach," an iron steamer about 30 years old, while on a voyage from Arecibo for Philadelphia with a cargo of sugar, experienced heavy weather, sprung a leak and put into San Juan, P. R. It was there discovered that there was a hole in a plate on the starboard side and at the edges of the hole the original half-inch of iron had worn to a knife edge, and the plate in the immediate vicinity was much decayed. The cargo of sugar was badly damaged and the owners claimed against the time charterers for the damage. The owners of the steamer came in as claimants and pleaded for limitation of their liability to the value of the steamer, which was agreed to be $60,000, which plea was allowed in the District Court.

The testimony in the District Court developed that the damage to the plate was not caused by any peril of the sea, but was due to the corrosion of the plate caused by chemical action of a mixture of sugar and salt water. That the contact of this mixture with the plate was due either to the cement backing of the plate being cracked or to the fact that the cement did not adhere closely to the plate, thus leaving a "pocket," into which the mixture of sugar and salt water could make its way. The steamer had been under time charter for a year when this accident occurred, and had during that time and previously carried many cargoes of sugar. The locality of the damage was such that had it been a crack in the cement it might have been discovered by lowering a light into a hole through some boards left loose for the purpose of examination, but if it were due to a "pocket" it could only have been discovered by removing the permanent ceiling and tapping the cement for hollows. It was evident that the corrosion of the plate had started prior to date the time charter went into operation and that therefore the vessel was not seaworthy at that time. In a time charter there is always an implied, and usually, as in this case, an express warranty that the vessel shall be seaworthy and that she shall be kept so at the expense of the owners, under what is known as the "maintenance clause."

The Court, Judge Hough, said:

> "It is right, and has never been doubted, that the owner who time charters his vessel thereby binds his vessel to whatever lawful freight the charterers put in her and for the safe transportation and delivery of that freight he should hazard his vessel. But to bind himself to an unlimited liability by such charter party for a period of years is a most extreme contention and it depends solely on the meaning to be given to the language of the maintenance clause."

Apparently the Court considered that as the time charterers were sole arbiters as to what cargoes the vessel should carry and on what voyages, and as the nature of her employment must be taken into consideration in determining the question of seaworthiness, it was their duty to use due diligence in ascertaining the condition of the vessel, any defects discovered to be made good at the expense of the owners. As said before, the District Court allowed the plea for limitation of liability.

In defense of the claim for damage to the sugar the respondents and claimants contended that for much, if not all, of the damage they are entitled to the benefit of the shippers insurance.

The lost sugar was shipped under bills of lading containing the familiar clause: "In case of any loss, detriment, or damage done to or sustained by said goods, or any part thereof, for which the carrier shall be liable to the shipper, owner, or consignee, the carrier shall to the extent of such liability have the full benefit of any insurance that may have been effected upon or on account of said goods."

INSURANCE COMPANY
Freights and Disbursements
STREETS, SAN FRANCISCO, CALIFORNIA

W. H. WOODRUFF, Special Agent
220 BYRNE BUILDING
LOS ANGELES, CAL.

F. HERRMANN & CO., Managers
ATLANTIC MARINE DEPARTMENT
37-43 WALL STREET NEW YORK

AND BRITISH COLUMBIA, 264 COLMAN BUILDING, SEATTLE, WASHINGTON

The insurance policies contained a clause which, while not exactly the same in all policies, was essentially as follows:

"Warranted by the assured free from any liability for merchandise in the possession of any carrier or other bailee who may be liable for any loss or damage thereto, and for merchandise shipped under a bill of lading containing a stipulation that the carrier may have the benefit of any insurance thereon."

The Court continues:

All the policies antedated the shipment, and were (pro tanto) voided by the issuance and acceptance of the bill of lading. The policies last referred to continue as follows: "But this company, in these and all cases of loss or damage by peril insured against, shall be liable and owe actual payment for (only) what cannot (and could not in the absence of this insurance) be collected from carriers and/or bailees of property lost or damaged, and shall also be chargeable with the direct pecuniary loss to the assured temporarily arising from delay in collecting from said carriers and/or bailees; and the advancing (for the purpose of avoiding only of such pecuniary loss) of funds to the assured for his protection pending such delay, shall in no case be considered as affecting the question of the final liability of this company, but as soon as collection is made from carriers and/or bailees, the assured shall retain only such proportion of the sum or sums so advanced by this company as will with the amount collected from carriers and/or bailees, make up the sum of the assured's loss, and the balance of the sum or sums as may have been advanced by this company shall thereupon be paid back to this company; but if no such collection can be made from carriers and/or bailees, the assured shall retain so much of said sum or sums so advanced by this company as shall not exceed the actual liability of this company thereby established (provided always the loss shall constitute in other respects a claim under this insurance)."

These clauses amount to a contract by insurers to advance sufficient funds to the insured to protect him from the pecuniary loss temporarily arising from delay in collecting from carriers, and to an agreement to pay the difference between actual loss and recovery from carriers, not exceeding the amount of the insurance nullified by the earlier words of the policy.

When libelants lost their sugar, this libel was filed by counsel for the underwriters, and a few days later receipts were signed by libelants evidencing large payments,(3) to them by their several insurers. The form of these receipts varies slightly. The variances are of no importance, and the material points may be shown by the receipt taken by the St. Paul Fire & Marine Company, which is one of the underwriters covenanting to advance money.

This receipt reads: "Borrowed and received of the [insurer] $18,583.30 as a loan, and not as a payment of any claim which we may have against said insurance company. This amount is loaned to us and is to be returned by us to the [insurer] when and to the same extent which we recover from any other person or corporation the value of [the lost sugar]. In consideration of said loan we hereby agree to use our best endeavors to recover the value of the sugar from all persons or corporations who may be liable therefor, and that we will institute and prosecute all suits in our name for that purpose, as we may be requested by the [insurers] but at their expense and not ours." It is signed by libelant.

As a compliance with the terms of its own policy, this receipt is a curiosity. But whether or not bound to do anything by their policies' terms, the receipts all show payments called loans, which the lenders are to get back as best they can by suing somebody at their own expense, but in the name of the insured. Sometimes the claim in suit, or the bills of lading for the lost merchandise, are specifically pledged for "repayment" of this "loan";(4) but all the receipts would leave the uninitiated with the belief that the "loan" had no other origin than a desire to buy a lawsuit.

The foregoing lengthy statement can be justified only by a desire that this case be taken further, and some settlement reached in a matter wherein the fictions and subterfuges of the law would excite the admiration of a casual ejector.

What was done in this case, the course of business pursued, the anticipated, agreed upon, and paid-for insurance schemes, differs from that pursued, investigated, and approved in the Burr and Bradley Cases in no material particular. The sole difference in the record is that these carriers have produced in court the man behind the apparatus of papers, and Mr. Ogden has naturally told the truth.

This record contains proof that, when a shipper gets insurance he (or his broker) knows that by the policy he pays for he is left (pro tanto) without insurance whenever he accepts a bill of lading requiring him to give the carrier the benefit of his contract; but he is contemporaneously assured that by a gentleman's agreement, paid for by his premiums, he will receive against usual proofs of loss the amount he would have gotten had there been no bill of lading, that he will never be called on to pay back any of the money, and that as far as he is concerned his insurance protection is as absolute as though one clause in the policy did not exist, because he is assured beforehand that in consideration of his premium that solemn warranty will not be practically enforced.

To say that a man in this condition is not insured, is nonsense; any insurance company that refused to make the so-called "loan" could be successfully sued, the complaint sounding in fraud and deceit. Indeed, recourse need not be had to a pleading in tort, for the real contract is not expressed in policy and riders. The actual and enforceable agreement is to pay the loss, provided it be always called a "loan." To say that what one must pay and does pay, parts with for a consideration, and can never recover from the recipient, is a "loan," insults understanding. Unless shams are loved for themselves, they must be encouraged for a reason. Such reason exists here; i. e., there has always been a settled hostility to the Erie & Western Case among the lower courts.

Nor do I suppose that all the shams above described were not patent to Wallace, J., when he wrote in the Bradley Case. It never needed Mr. Ogden's admissions to enable that judge to see what he wished to perceive behind the machinery of misbranded papers. There has never been any desire to pierce through pretense to truth, and that which defeated the carrier's defense has been almost uniformly viewed with approval. But Wallace, J., saw that the time must come when the truth would come before some court, and how far he was prepared to go is shown in 153 Fed. 353, 82 C. C. A. 429: "It is not important that the [insured] may not have expressly consented to receive the payment as one not made by the insurance company in recognition of its liability. It suffices if the insurance company did not intend to recognize its liability." And again: "The parties were at liberty to agree that the payment * * * should be regarded as a loan or as a gratuity."

Even on the papers the learned court found the word "loan" a little difficult; gratuity certainly goes far enough. Of course the assured will agree to any form of papers which gets him his money quickest, so that it has been solemnly held in this circuit that, whatever the payment is called, whatever the label put on it, controls, at least sufficiently to close the mouth of the carrier tort-feasor. Mr. Ogden assuredly put on the labels, he has doubtless read the cases, and what his companies can never recover is consistently called a "loan," and at present this seems enough to make it a loan for legal purposes.

The decision of the Circuit Court of Appeals is as follows:

PER CURIAM. [1] Judge Hough, in the two opinions delivered at final hearing and on the limitation of liability, has said practically all that it is necessary to say upon the questions now debated. We may add, however, that we are satisfied that the Luckenbach was unseaworthy as the result of gradual corrosion of the plate at a point where there was no cement or where the cement was cracked.

The contract of carriage was between the McCahan Company and the charterers. The charter not being a demise, the charterers cannot take advantage of the statute limiting the liability of vessel owners.

The cause of the accident being neither an error of navigation nor of management, they are not protected by the third section of the Harter Act.

If the bill of lading contains an exception of unseaworthiness, which we believe it does, the charterers are not protected by the second section of the act, because they have not exercised due diligence in respect to the condition of the steamer.

[2] It follows that the libelant is entitled to recover in full against the charterers, unless the clause in the bill of lading as to its insurance protects them. Under prior decisions of this court (Pennsylvania R. R. Co. v. Burr, 130 Fed. 847, 65 C. C. A. 331; Bradley v. Railway Co., 153 Fed. 350, 82 C. C. A. 426), it does not, and we are not disposed to depart from these decisions. Though the purpose of the insurance company is quite apparent, we can understand a contract of loan which is to be repaid only on a certain condition—e. g., the shipper's recovering against the carrier.

[3] As between the charters and the owners, the latter are under an express obligation to maintain the steamer in a seaworthy condition. It is not fulfilled by her being seaworthy at the beginning of the charter, or of any voyage under the charter. Our decision in The Benner Line, 217 Fed. 497, 133 C. C. A. 349, holds that the owner cannot limit his liability against this express contract.

The decree should be modified, so as to award the libelant its full damages, payable primarily out of the steamer and the estate of Luckenbach, any deficiency to be paid by the charterer, with interest and costs.

REVIEWS

"Russia," the foreign trade journal issued by R. Martens and Company, contains an interesting warning for American manufacturers in the January issue. It is pointed out that with the return of peace in Europe that there will be an entirely new set of buyers in the Russian market. At the present time Americans are selling to Government officials, later they will have to sell to the Russian manufacturer and farmer.

* * * *

"Strength of Ships"

By Athole J. Murray, Grad. R. N. C., Assn. M. I. N. A., with diagrams, plates and tables, Longmans, Green & Co., New York; price $5 net.

This work is primarily and solely a treatise on the subject of ship strength and the problems underlying same. Chapters are devoted to Stress, Strain and Elasticity—Materials of Ship Construction — Beams — Columns — Shafts—Longitudinal Strength—Transverse Strength—Watertight Bulkheads—The Strength of Plating—Fastenings—Rigging and Outboard Fittings—Rudders.

The book is of a practical nature and is clearly the outcome of experience. Mathematics is only introduced where absolutely necessary. A great deal of new matter on the strength of bulkheads, curved bars and stanchions is embodied in the chapters dealing with these subjects. Altogether, Mr. Murray has given us quite a notable work and one that is sure to find favor with naval architects and shipbuilders.

* * * *

"Johnson's Steam Vessels of the Atlantic Coast—1917

Price $5. The Eads Johnson Publishing Company, 30 Church street, New York

The 1917 edition of this work fully bears out the promise of the first edition, which was put out last year. The claim that this is really a "working edition" is fully substantiated, as a more simple and handy tabulation of vessels and their power equipment could hardly be gotten together.

* * * *

Volume V of "Sun Oils" contains an exceedingly interesting description of the Sun Oil Company's own barrel making plant at Rocky Gap, Virginia. The making of oak staves and barrel heads is described at length in a readable and instructive manner.

THE AMERICAN BUREAU

The Annual Meeting of the American Bureau of Shipping was held on January 23. The large attendance at the gathering was most gratifying to the officers, who were most agreeably surprised at the intense interest shown in the bureau's work.

The report of Stevenson Taylor contained much of interest. Statistics clearly show that the Bureau is rejuvenated, and both executive committees and the membership at large are to be congratulated on the rapid progress of the only American classification society. The resume of the activities of the Great Lakes Department was truly indicative of a great future for American classification.

Mr. George J. Baldwin, Mr. Louis F. Burke and Mr. N. de Taube were elected to the board of managers, and Mr. Burke was also named as one of the vice-presidents. The officers elected for the ensuing year are as follows: President, Stevenson Taylor; vice-presidents, Antonio C. Pessano, Frank Gair Macomber, William .H. Todd and Louis F. Burke; secretary and treasurer, John W. Cantillion.

Maritime Law Notes

THE Supreme Court of the State of California has declared that the State Industrial Accident Commission has jurisdiction over accidents occurring on vessels which have a California port registered as their home port and that maritime and Admiralty law do not supercede this authority. The case before the court was that of George Rose, a sailor, who was slightly injured on the steamer "Yucatan," on October 2, 1914, the vessel at the time being outside the three-mile limit, off the coast of Oregon. The Industrial Accident Commission allowed Rose $170, and the State courts have upheld the award. A similar case has been carried to the U. S. Supreme Court from another State. The question is one involving the extent to which State laws have effect in maritime cases occurring outside of State waters. The decision will be of considerable interest to shipowners.

Last June the steamer "Bremerton," Captain Fredenborg commanding, collided with the steamer "Flyer" in Richards Passage, Puget Sound. The local U. S. inspectors of the district charged Fredenborg with violating Article 25, Rule 9 of the pilot rules, which is known as the "narrow channel rule," which provides that when a vessel is navigating a narrow channel she shall keep to that side of the fairway on her starboard bow. Fredenborg retained E. E. Kelly, a Seattle Customs House broker, to take care of his case. At the trial of Fredenborg before the local inspectors, Kelly argued that the inspectors had no jurisdiction, basing his claim on the general rule of the steamboat inspection service, which authorizes inspectors to investigate collisions only when there is loss of life or damage to the vessel to the extent of $100, this rule apparently eliminating the "Bremerton." Kelly also held that Richards Passage, being a mile wide, did not come under the "narrow channel" rule. The inspectors, however, found Fredenborg guilty of infringement of the "narrow channel" rule, and suspended his license for thirty days. Acting on the advice of Kelly, Captain Fredenborg refused to surrender his license, and made an appeal to Captain John Bulger at San Francisco. Bulger sustained the findings of the Seattle local inspectors. As the suspension was for less than six months, the case could not be appealed to the Inspector General at Washington, and Captain Fredenborg still retained his license on the ground that the whole proceedings were without authority of rule or law. In order to bring the matter to a head, however, Uhler brought the case before the Department of Commerce and that department instructed the Customs Department to fine the steamboat and Captain Fredenborg $100 each for every trip the vessel had made during the period when Captain Fredenborg was supposed to be without a license. Accordingly suits were instituted for $13,000 against the ship and a similar amount against her master. This brought the matter into the Federal courts, and U. S. Judge Neterer handed down a decision that the local inspectors had no legal authority to suspend the master's license. Appeals from the findings of the Steamboat Inspection Service by men who have had their licenses suspended are very rare, but the refusal of a master to surrender his license during appeal is unique, and the case has aroused much interest.

The arrival of the steamer "Montanan" on February 15 marked the first visit of an American-Hawaiian steamer in nearly a year. The "Montanan" brought nearly ten thousand tons of sugar from the Hawaiian Islands, and will continue in this service with the "Texan" during the Hawaiian sugar season.

The Hanlon Dry Dock and Shipbuilding Company are rerigging the Alaska Packers' bark "Big Bonanza" into a schooner; they are rerigging the Peruvian bark "Elizabeth"; overhauling the "Cleone," overhauling Peterson's boats, and doing all the drydocking and overhaul business they can attend to.

Freight Report

By PAGE BROTHERS

February 20th, 1917.

OUR last circular was dated January 20th, and not a single steamer or sailer has been chartered since for grain to U. K. or Continent.

Business has not been lively in time charters, but rates are firm. The steamer "Talabot" is reported to have been again rechartered by Andrew Weir to London charterers on the basis of 40/, and by them chartered to proceed from this port in ballast to Chile to load nitrate, it is reported, to Suez. She will go via Cape of Good Hope. In her time charter she is not allowed to go to Europe or the Mediterranean. The next highest charter has been that of the new steamer "Louise Nielsen," sister ship to the "Hanna" and "Niels Nielsen," taken by Frank Waterhouse & Co. for about six months, it is reported, at a rate of £18,000 per month.

Japanese steamers, on account of their size, and not being as economical, have accepted rates of 16½ to 17 yen for one or two rounds trans-Pacific, delivery and redelivery Japan. The Robert Dollar Co. has chartered "Suki Maru" and "Tensho Maru" at the latter rate. Some of the new steamers building up North are willing to accept 40/- for twelve months, but our Charterers, on account of the uncertainty of the war, etc., do not care to take any on speculation for so long a time.

Mitsui & Co. have chartered the steamer "Niels Nielsen" to carry lumber from Puget Sound to Bombay or Calcutta on private terms, and Comyn, Mackall & Co. are sending the Norwegian steamer "Thordis" with lumber from Columbia River to Bombay at the reported rate of 250/- per thousand, one of the highest rates paid for lumber to any destination for quite a while.

E. Clemens Horst Co. bought American steamer "Hilonian" from the Matson Navigation Co. at $450,00 for account of Swedish buyers, but on account of the President's proclamation not allowing the transfer or the chartering of American steamers to foreign concerns, the former were obliged to resell, which they have done, on private terms, to the Pacific Freighters Co. The latter have now put her on the berth from San Francisco to Cuban ports, and to New York with sugar from Cuba as a final destination, where they have every prospect of reselling her at a handsome profit. The American steamer "Minnesota" has been bought by a New York concern for about $3,250,000 (at least that is the street talk), and she was put on the berth to carry enough cargo to allow her to go through the Panama Canal to New York. Amongst other items, she is supposed to have taken about 5100 tons of California wine. The ex-whaler "Beluga," on her arrival at San Francisco from Chile, via Port Allen, with nitrate from Chile, has been resold to Chilean parties on private terms. The Petroleum Products Co. has chartered British sailors "Rona" and "Raupo" to come up in ballast from New Zealand to load case oil from here to Australian or New Zealand port at about 80c per case. The Canadian Trading Co. has chartered motor-boat "Laura Whalen" to carry lumber from British Columbia to a direct African port, at about 240/- per thousand.

For Australia, several schooners have been chartered on a basis of 120/- Sydney and 135/- to Melbourne or Adelaide.

The West Coast freights are ruling at about $31.50 to $32.50 per thousand.

There does not seem to be as large a volume of business for Australia as for the Orient in the way of general cargo as had been expected.

PAGE BROTHERS.

NEW CONTRACT FOR SKINNER & EDDY

The International Petroleum Company has ordered a tanker from the Skinner & Eddy Corporation, Seattle, to be 420 feet long between perpendiculars, 57 feet beam and 31 feet 6 inches deep. She will have a capacity of 65,000 barrels and be driven by General Electric Curtis geared turbines.

Fire Damage to "Congress"

B. K. Martland, Chief Engineer of the steamer "Congress." Mr. Martland and his crew stuck by their engines on the burning steamer as long as there was a chance of using the machinery for any purpose.

THE burning of the steamer "Congress" off Coos Bay on September 14, 1916, the transferance of her crew and passengers without the loss of a single life, the jockeying of the big vessel into Coos Bay after the fire had died out, and the subsequent work of the engineer's crew in preparing the coaster for a trip to Seattle under her own steam mark the peculiar ingenuity that often manifests itself in engineering and deck officers when a vessel is in hard straits.

The Congress was built at the New York Shipbuilding Company's plant and was brought around to this coast in 1913. At the time of her completion she was the largest coaster yet constructed for an American run, and therefore attracted considerable attention. She is 424 feet 8 inches between perpendiculars, 54 feet 9 inches moulded beam and 29 feet moulded depth to the upper deck, 9 feet 6 inches from the upper to shelter-deck, 8 feet from shelter-deck to bridge-deck, and 8 feet from bridge to boat-deck. She has five complete stel decks running from stem to stern and ten watertight bulkheads extending to the upper deck. The engine and boilers are amidships, there being ten single-ended Scotch boilers arranged in two fire rooms, and two triple expansion engines, each developing about 3,700 horse power. In way of the boiler rooms, longitudinal bulkheads about six feet from the skin of the ship and built independently therefrom form fuel oil tanks, a thwartship bunker separates the fire room from the engine room, a passage for communication, steam pipes, etc., being cut amidships.

The "Congress" was originally planned for a coal burner, and a very large thwartship bunker was fitted just forward of the boiler room. When it was decided to change over to oil fuel, while the vessel was building, this bunker was converted into a cargo hold and was known as No. 2½ hold. It was subsequently used for transporting fuel oil on northward trips. The vessel has a complete double bottom from peak to peak, and those under the fire rooms were utilized for oil fuel. The electric plant consisted of three 50 k. w. generating sets, located at the after end of the shaft tunnels, ventilation being secured through a wide trunk extending to the boat-deck. The armored conduit in general use in the navy was used for the wiring mains.

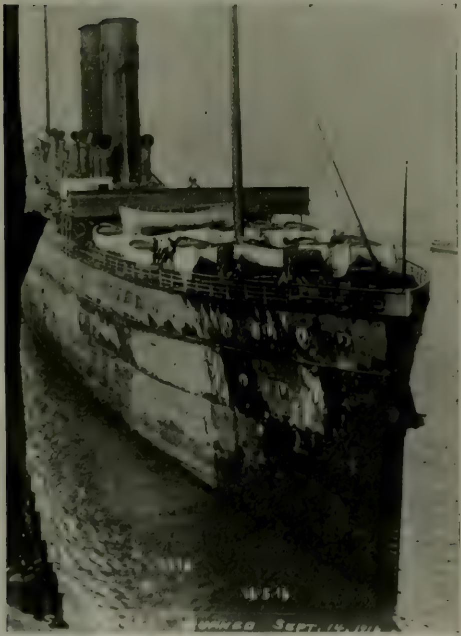
The upper deck was the lowest passenger deck, it housing the main dining saloon, kitchen, pantry, firemen and steward crew quarters, mess rooms, second class dining room, etc. The shelter deck was given over to passenger accommodations aft of the forward 'tween decks. On the bridge and forecastle deck was a long house with social hall and first class quarters and second class lounge and smoking room aft, the hatches to Nos. 3 and 4 holds being trunked through to the boat deck. On the boat deck were fourteen standard lifeboats under Norton sheath-screw davits, each boat being nested over a life raft.

The fire which gutted the Congress started in No. 3 hold, the exact cause not being discovered. For a time the presence of danger was kept from the passengers while the engineer's crew attempted to smother the blaze with steam. It was soon seen, however, that the fire was a very bad one, and the chances of controlling it were soon gone. A run was made for the beach, and the "Congress" brought to anchor. The U. S. Government seagoing dredge "Michie" was fortunately working on Coos Bay bar, and it was to her that the passengers were transferred. The chief engineer and his crew stuck by their posts as long as there was the least possible chance of their being of any service. In fact, the chief was overcome with smoke, and carried to deck.

Owing to the density of the smoke and the growing heat, it was impossible to utilize any of the lifeboats except those on the windward side. These were lowered without confusion and in very quick time, the passengers, as well as the crew, maintaining remarkable order. The captain and crew stood by while the vessel was burning, and when the hull was sufficiently cooled off went on board and the vessel was towed into Coos Bay,

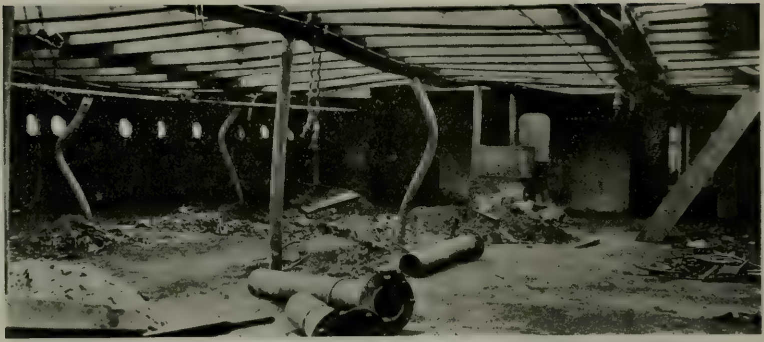
A boat winch that nearly broke away from its moorings.

The fire left a mess of wreckage from stem to stern.

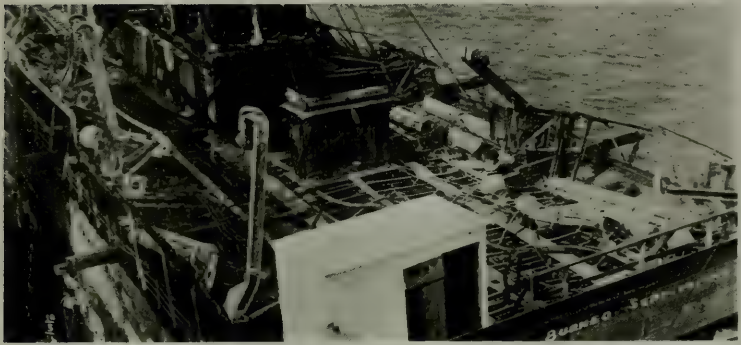


Bow view of the burned "Congress," showing boats nested forward.

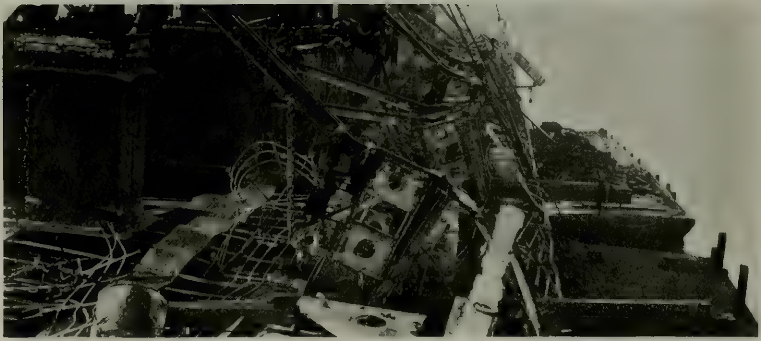
A switchboard on the bridge deck. The armored conduit stood the fire perfectly.



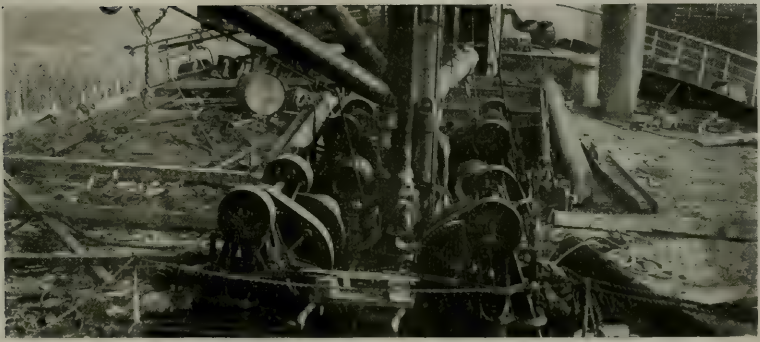
ladies' writing room and purser's office. The ship's safe stood against No. 2 hatch casing and came safely through the fire.



Looking across the bridge and forecastle deck. Completely gutted, the vessel nevertheless came 500 miles under her own steam and landed 7,000 barrels of fuel oil.



A mass of twisted steel cluttered up the decks amidships. Despite the evident heat of the fire the fuel oil tanks remained intact and the oil did not burn.



On the bridge deck forward. The cargo winches stood the fire well and were used in hoisting debris out of the ship when she was brought to Seattle.

where the task of getting the engines, boilers, steering gear, etc., into shape for the trip north to Seattle was begun.

The fire had swept the vessel from stem to stern burning out all the cargo in all four holds, completely destroying the deck houses, in fact consuming everything inflammable on board with the exception of the fuel oil.

The damage in the engine room and fire room was caused mainly by water. In the wing tanks to the outboard of the boilers were 7,000 barrels of oil and another 1,000 barrels were in the double bottoms under the two fire rooms. The wing tanks, extending the full length of the fire rooms and from the inner bottom to the upper deck, stood the fire magnificently. The gas from the oil was continully igniting and spouting up into the air for twenty feet or more.

The lighting plant was out of business through being soaked with water and an engine and generator were secured from the S. S. Salvor and set up on the upper deck at the after end of what had been the main dining saloon enclosure. Wiring was run for 100 lights, and also for furnishing power to the ship's machine shop, which is located on the main deck in the way of the engine room. Electric bells from bridge to engine room and vice versa were also installed and telephones from the bridge to the engine room and from the bridge to the steering engine aft. The electric conduits were all of the navy type, and stood the intense heat of the fire in splendid shape, not a joint or a pipe being broken, and all ready for use again. As was to be expected, the wires were burned so badly that they pulled apart. The steering gear was worked directly from aft at the steering engine, telephone directions being received from the bridge. The vessel made the 500 mile run from Coos Bay to Seattle at a 12 knot clip.

The winches, as well as the steering gear, both of which were supplied by the Hyde Windlass Company of Bath, Maine, stood the fire splendidly. While the winches were badly out of line, a temporary steam line was run to them, and they were used at Seattle in hoisting the debris out of the ship. Six thousand barrels of oil were also delivered at Seattle.

Some idea of the damage sustained by the hull of the ship may be gathered from the pictures accompanying this article. All the decks will have to come out and be renewed, together with the greater portion of the deck beams. A large number of frames will also have to be replaced and the side plating practically from stem to stern and down from the bridge and shelter decks to the upper deck will have to come off.

The burning of the "Congress" furnished one of the most spectacular proofs of the safety of carrying oil fuel that has ever been noted. The twisted, tangled metal shown in some of the pictures bears mute testimony to the heat of the fire, and yet the oil in the fuel tanks was not ignited.

From the discovery of the fire in No. 3 hold until the arrival of the "Congress" under her own steam at Seattle, the officers and crew of the vessel performed a splendid service, and to Ben K. Martland and his assistant engineers belong the double distinction of earning the highest praise for their conduct during the fire and again for their ingenuity and skill in operating the damaged engines and auxiliaries.

At present writing the final disposition of the "Congress" is still in doubt. It is not known whether she will be rebuilt as a passenger and freight boat or be altered into a freighter. In the latter case one fire room could be dispensed with and the vessel would have a cargo capacity of about 8,000 tons.

BOAT BUILDING ON THE SOUND

There has been a decided boat building boom on Puget Sound, many of the builders having a larger amount of work on hand than for many years previous. Among the many builders of small craft who are operating their plants at full capacity are the Babare Brothers of Tacoma, Washington. This concern has taken fifty-four contracts for fishing boats and cannery tenders to be delivered before the next salmon fishing season in the spring. These contracts were all signed between the middle of October and January 10th. Since the latter date, Babare Brothers have turned down thirty contracts and can not accept any more till the middle of the present month, when they will be in a position to handle about ten more craft before the close of the active fish boat building season. All of the boats mentioned will have to be completed by July 1. From ten to thirteen boats are always on the stocks, and one is completed every third day. By the middle of the present month the output will be increased to one boat every second day.

Twenty-eight of the boats building at the Babare Brothers plant are 65 feet in length, the others 60 feet, and all but four will be equipped with Standard Gas engines.

It is understood that the California Shipbuilding Company has orders for two 8,800-ton d.w. freighters.

The Burns-Philp Trading Company of Sydney has ordered three trading schooners from the Stone Shipbuilding Company of Oakland. The vessels will be 117 feet long by 27 feet beam by 11 feet moulded depth. They will be rigged as top-mast schooners and each will have a 120-h.p. gas-engine as an auxiliary.

"ISHERWOOD" SYSTEM OF SHIP CONSTRUCTION

Although the current year, so far as Great Britain is concerned, has not been very productive of mercantile construction, and most of the construction of merchant vessels has been carried on in the United States of America and Japan, it is a noteworthy fact that the "Isherwood" System still maintains the high position it has gained, and has made considerable progress during the present year, particularly in the two countries above mentioned.

The number of "Isherwood" vessels contracted for to date in this year is 152 with a total gross tonnage of about 698,875, which is equivalent to about 1,000,000 tons in deadweight carrying capacity, thus making the total number of vessels built, under construction and on order 620, with an aggregate deadweight carrying capacity of over four and a half million tons. The following table is probably of some interest in showing the steady manner in which this total has been reached in a comparatively short length of time:

Sept. 1907 to Dec.,	Ships	Aggregating tons deadweight carrying capacity
1908	6	31,608
1909	36	212,992
1910	76	484,752
1911	140	958,795
1912	240	1,777,348
1913	270	1,993,034
1914	311	2,351,322
1915	468	3,548,221
1916	620	4,666,000

Whilst the "Isherwood" System has achieved an overwhelming predominance in some types of craft, the following analysis of the 620 vessels referred to above, shows most distinctly the suitability of the system for all types and classes of vessels:

		Agg. tons deadwt. carrying cap.
General cargo vessels	221	1,645,200
Oil tank steamers	265	2,413,750
Colliers and ore steamers	25	255,000
Passenger vessels	9	44,600
Great Lakes freighters	24	279,600
Barges	73	25,850
		Gross reg., tons.
Dredgers	2	760
Trawler	1	570

During the year the British government has again signified its approval of the system by constructing further oil-tank steamers and certain craft of another type.

In the United States of America, well over 90 per cent of the oil-tank tonnage at present under construction and about 50 per cent of the total merchant tonnage is claimed by the "Isherwood" System, as is also a very large proportion of the merchant ships now being built in Japan.

SAILING SHIP PICTURES

The **Pacific Marine Review** is in receipt of four prints of reproductions of paintings by Captain W. B. Whall, issued by James Brown and Son, 52 Darnley street, Glasgow. These prints are reproductions of Captain Whall's four most noted water colors, namely, the "James Baines," the "Port Arthur," the "Lightning" and the "Hotspur." They are printed in brown tint collotype, plate sunk on stout board, and are finished in a style altogether suitable for framing for office or home walls. The price of each picture securely packed in a tube, per post, is two shillings and fourpence, any two can be had for 4/6, or the four pictures for 8/6. We may also state that Captain Whall does not receive any royalty on these prints as he has ordered that these perquisites be turned over to the Red Cross or other war charity funds. Anyone wishing any of these pictures can obtain same by ordering direct through James Brown and Son or through the office of the **Pacific Marine Review.**

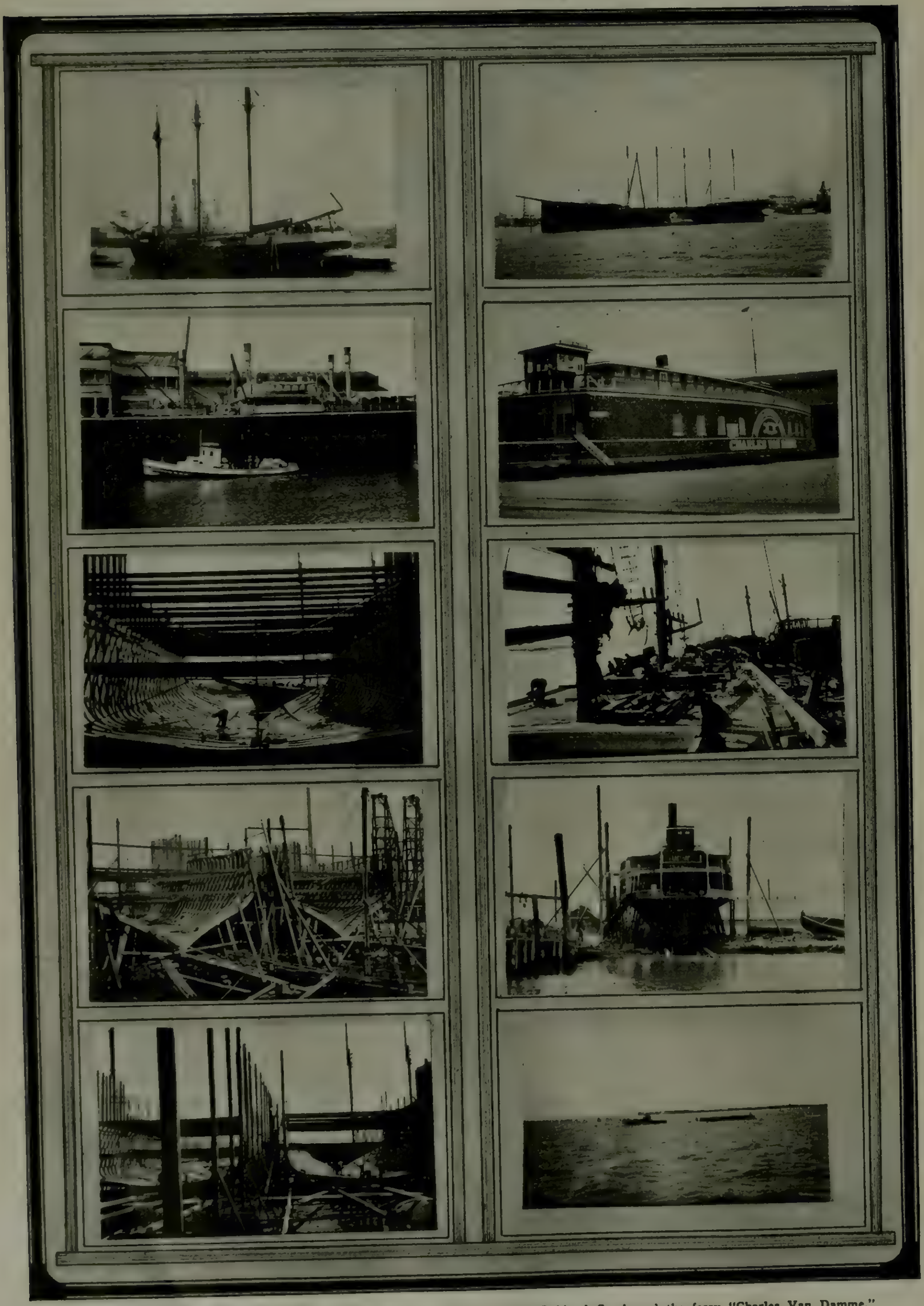
MARINE CASUALTIES

NORTHWESTERN, Str., Dec. 29. While on a voyage from Portland to San Francisco was in collision with the steamer Northland, south bound. The damage to the Northwestern was estimated as between $12,000 and $15,000, repairs to be made at Seattle. Insurance placed locally and abroad. At the time of the collision the steamer was under charter to the San Francisco and Portland Steamship Company for two or three trips during the winter season, but, owing to the time necessary to make repairs, the charter was cancelled.

NORTHLAND, Str. (See report under Northwestern.) Steamer reached Portland where she was docked for repairs. Estimated cost from $5,000 to $7,000.

ADMIRAL WATSON, Str. From Valdez for Seattle, struck a reef in Fidalgo Bay on January 4th. She was later floated and proceeded to Seattle under convoy. Repairs estimated at about $25,000. Insured locally and abroad.

TSUSHIMA MARU, Jap. Str. From Hong Kong for San Francisco and New York, arrived at S. F. January 14 with fire in the cargo in No. 3 'tween decks which had been burning for several days. Efforts to extinguish the fire on the passage by turning live steam into the hold were not successful. On arrival here the services of a fire boat and a chemical engine were enlisted and the fire was extinguished. Damage confined principally



Views of schooners building at Stone's Oakland yard, activities along Oakland Creek and the ferry "Charles Van Damme."

to hides and beans by steam and to camphor oil and curios by fire. General average estimated at 5 per cent.

STANLEY DOLAR, Str. From Seattle for Alaskan ports went ashore in Active Pass, B. C., on January 12th. She was later floated but owing to extensive damage she returned to Seattle for repairs. Cost of repairs estimated at about $25,000.

UMATILLA, Str. From San Pedro for San Francisco and Seattle was in collision January 14 with the steamer Daisy Putnam inbound for San Pedro. The Umatilla proceeded on her voyage and will be repaired at Seattle.

HAROLD DOLLAR, Str. From Vladivostok for Vancouver via Shanghai had a fire in the cargo in No. 2 hold while at Shanghai. Extent of damage not known. The steamer is expected to arrive at Vancouver March 2.

KONA, Sch. From San Francisco November 21 for Adelaide ran ashore on Kangaroo Island and latest reports are that she has broken up and is a total loss.

DAISY PUTNAM, St. (See Umatilla.) Cargo was discharged at San Pedro and the steamer proceeded to San Francisco for repairs.

ROANOKE, Str. The sinking of this steamer on May 9, 1916, was the cause of litigation regarding the insurance on the vessel itself. The steamer sailed from this port with a general cargo on May 8 at 10:30 p. m., bound for Valparaiso. On May 9, at 2:30 p. m., she commenced to take a list and as the efforts to right her were unavailing, she sunk, and all on board, with the exception of three, were lost. Underwriters on the hull denied liability on the ground that the steamer was improperly and overladen, therefore unseaworthy. The case was tried before a jury, and on February 17, after being out about ten minutes, the jury returned a verdict that the vessel was seaworthy. As this is a jury decision on a question of fact it would appear that the underwriters have no recourse and must pay.

A QUICK REPAIR JOB

The Hanlon Dry Dock and Shipbuilding Company is being congratulated on an excellent piece of repair work executed in record time. On February 15 the "Daisy Putnam" was ready for sea again after her collision with the "Umatilla" in San Pedro harbor. Sixteen new planks were put in below the guards; new waterways were installed, nine strakes of ceiling were removed and renewed; thirty new knees were provided and braced in place and the vessel was completely caulked. Despite the fact that waterfront opinion was to the effect that the vessel would be laid up for five or six weeks, these repairs were effected in 15½ days.

The Hanlon management has succeeded in securing a lease for twenty-five years, with an option of twenty-five more, on sufficient land to warrant the company going ahead with development work and enlarging of the plant. This obstacle having been removed, there is nothing left to stop the concern from rapidly becoming one of the best known shipbuilding and repair establishments on the Pacific Coast.

MORE ORDERS FOR AMES COMPANY

The Ames Shipbuilding & Dry Dock Company of Seattle has secured orders for two tankers, 420 feet between perpendiculars, 57 feet beam and 31 feet 6 inches moulded depth. One of these vessels is for the Standard Oil Company of New Jersey and the other for the International Petroleum Company.

The new motorship "City of Astoria," built by the McEacharn Shipbuilding Co. of Astoria, is loading cargo at local mills for her first journey. Her departure was delayed by the failure of anchor chains to arrive from the East, the equipment being several months en route.

Standifer-Clarkson also secured an order during the month for a large steam schooner from the Interocean Trading Co. of San Francisco. The vessel will be 269 feet over all of 2,000,000 feet carrying capacity, and is to be delivered in August.

Local shops of all kinds are busy with ship orders. The Pacific Tent & Awning Co. is making eight sets of sails, each order representing $5,000. Hundreds of other small business firms are likewise profiting from the boom.

Continuation of the labor trouble put a slight damper on the trade for a time but as in no case has the union element won out, the effect has been slight. The plants of the Columbia Engineering Works were affected for a time, while pickets are still maintained outside the Willamette Iron & Steel Works. Both plants are working full crews, however, under the open shop plan.

Two well known marine men passed away during the month. Captain J. E. Gore, who started his career on the Columbia River, and ended as marine superintendent of the Canadian Pacific, died January 18 at Nelson, B. C. Captain Ralph Baughman, master of the government boat "Asotin" died at Lewiston, February 4. Both were well known among the traveling and marine public.

An Alaska service is promised Portland by C. A. Burckhardt, head of the Alaska Pacific Fisheries, who, with associates, has purchased the steamer "Kuskokwim River," and will install the engines of the torpedo boat "Fox" in her. She will be renamed the "Portland."

View in the new addition to the Standard Gas Engine Company's Oak land plant.

SHOP EXTENSION NOW OCCUPIED

The accompanying views are taken in the new shop etxension at the Standard Gas Engine Company's plant in Oakland. The rapidly increasing business of this gas-engine firm made increased shop facilities necessary, and during the latter part of 1916 an additional shop bay was added. The new addition is given over largely to assembling engines, storage and shipping, and has had a marked effect in relieving the congestion in the older parts of the establishment.

THE CAPE HORN SONG

In February we published a version of the "Dreadnought" song, and as this created considerable interest we are venturing upon another old sea ditty, "The Rounding of Cape Horn":

'Twas in the good ship "Rover," in Plymouth Sound we lay,
A-waiting there for orders would bear us far away,
A-waiting there for orders would take us far from home,
The orders were "For Rio and from there around Cape Horn."

We stood as any man might stand, we stood all in a row,
With trousers and white jumpers, boys, as white as any snow;
From ship to ship they cheered us as we did sail along
And wished us pleasant weather for the rounding of Cape Horn.

When we arrived in Rio we anchored for a while,
We set up all our rigging, boys, and bent all our new sail,
With hearts as light as feathers, boys, we hove our anchor home
And sailed again upon our voyage for the rounding of Cape Horn.

For the rounding of Cape Horn, my boys, fine nights and pleasant days,
And the next place we will anchor will be Valparaiso Bay,
Where those Spanish girls they are so sweet I honestly declare
They are far before your English girls with their curly locks of hair.

They dearly love a sailor bold when he is on a spree;
They will go with you and dance with you if you spend your money free.
But when your money is all gone they will not on you impose,
Not like those saucy English girls who will steal and pawn your clothes.

Adieu to Valparaiso, adieu then for a while,
And to all those pretty Spanish girls that live upon that soil,
And if I live to be paid off I'll sit and sing this song,
"God bless those pretty Spanish girls and the rounding of Cape Horn."

The new addition to the Standard Gas Engine Company's plant is be ing utilized for erecting and stock storing purposes.

NEW ENGINEERING COMPANY

Announcement has been received from the Crisp Engineering and Equipment Company to the effect that they are handling the well known compositions of the Amalgamated Paint Company in California. The Crisp Engineering and Equipment Company, of which Mr. Melbourne Crisp is the leading spirit, was formed for the purpose of acting in a general engineering capacity as owners' representatives on marine construction work and for carrying on a general engineering and advisory business. In addition to handling the compositions mentioned above, the Crisp Company is agent for the Talbot steam boiler, crude oil torches, metallic packing, refrigerating machinery, steam turbines, etc. Plans, specifications and estimates are furnished on all classes of new work, guarantee engineers provided, and general supervision for owners' account carried through. Mr. Crisp enjoys a splendid reputation up and down the coast, and his long connection with the Government lighthouse and revenue cutter service has enabled him to bring a large and unique experience to bear upon the problems of the work which he has now undertaken.

ELECTRIC PORTABLE TOOLS AN ASSET

(Communicated)

Only the man who has been reared within sight and sound of a shipyard—who has watched the development of a boat from the drafting board until she slid off the ways—can appreciate the vast saving of time and labor which has been accomplished in marine construction by portable electric tools.

The writer has seen a shipyard swarming with men laboriously boring holes by means of an old style ship augur.

He also saw what he believes was the first portable augur, drill and reamer combined ever used in marine work. This was in a yard on the Great Lakes.

The device consisted of a series of sections which could be manipulated like a folding rule with belt-driven pulleys on each joint, the augur or other tool at one end and power furnished at the other end by a donkey engine. This unique device had a working radius of about thirty feet and would bore about twenty holes to the old hand augur's one.

The development of small electric motors made possible the application of the portable idea to the operation of drilling, reaming and grinding, but a wealth of experimenting was necessary to develop anything like a reliable tool which would stay on the job.

In the case of the Van Dorn line of portable electric tools we overcame the various defects as they exhibited themselves by a long series of experiments in our own shops and in hundreds of shops of our friends and customers.

The primary difficulty to be overcome was that of producing a tool sturdy enough to withstand the rough usage to which this type of tool is subjected and yet have it electrically and mechanically effective.

It is no reflection on the type of workman to be found in marine construction circles to say that they are not of the pink tea variety—their work demands that they are more or less strenuous in their physical and mental make-up and he who makes their tools must keep this fact in mind.

After having evolved a motor housing which would withstand rough usage without being unnecessarily heavy, we turned our attention to the motor, and finally decided that a general purpose stock motor was not suitable for our purposes.

We installed a motor department and worked out several motors all of a distinctive type, but wound for the different speeds which experimental and field work had established as being the most suitable for different kinds of work.

In common with other manufacturers in this field, we had been working to produce a tool which would not overheat and burn out the motor or fuse the switch contacts—the two commonest forms of trouble in portable electric tools. We eventually developed our present quick-acting make and break switch, which operates as quickly when breaking as when making contact, and requires but a very slight touch on the control.

This switch practically eliminates the sticking and fusing of switch contacts which formerly sent so many tools to the repair shop.

Realizing the considerable degree of protection given to the motor by this switch workmen would occasionally work a tool beyond its capacity for extended periods, which overload had a tendency to overheat the motor and endanger the windings.

To offset this so far as was consistent with good working practice we increased the load capacity of the motor so that it would stand up under reasonable overloads. The motor temperature is kept down by fan on the armature shaft.

By thus producing a dependable tool we greatly enlarge its field of practical usefulness and gave the ship builder and shopman a reasonable assurance that his men would not be subjected to frequent lay-offs due to the failure of tool.

During this period of improvement in design of motor and switch, other improvements were made, one, a most important one, being in the design of the switch receptacle and housing.

Formerly when it was desired to renew or change a cable or conductor cord on electric tools, it practically was necessary to dissemble the tool. With our present form of connection in the switch box the removal of a cover exposes the connections and likewise renders it an easy matter to renew fuses.

Gears were given a new ratio and cut, heat-treated and hardened and the present design permits them to run in grease so that one application of grease after every 300 hours of duty is sufficient. The simple and efficient lubricating system and ball bearings where advisable assist materially in prolonging the life of the tools under severe heavy duty.

It is unnecessary to tell the man interested in ship construction and maintenance of the various ways whereby portable electric tools have become standard equipment in the yard and shop and aboard ship. It is sufficient to say that where there are holes up to 2-inch diameter to be drilled or reamed or light grinding to be done, a type and size of portable electric tool adapted to the economical disposition of the work is indispensable.

The Van Dorn electric portable tools are finding a wide field in shipbuilding operations both steel and wood.

THE ISHERWOOD SYSTEM

The adaptability and value of the Isherwood system of ship construction is reflected in no more positive light than in the adoption of this system in ships already in operation or actually building. A month ago (in December) 603 vessels, representing about 4,469,000 tons d. w., were already built or under contract on the Isherwood system. This aggregate tonnage comprised 265 bulk oil carriers, aggregating 2,397,800 tons d. w. and 338 other vessels, including cargo steamers of all types, passenger vessels from ocean liners to light craft, and a quantity of barges, representing in all a total of 4,469,000 tons d. w. carrying capacity.

Since, there have been added for construction under the Isherwood system in the United States alone thirty-one ships, consisting of sixteen bulk oil carriers of a total of 116,000 tons d. w., and fifteen other vessels of the first class cargo type, having a total of 163,000 tons d. w. Adding to these figures, there is reported seven ships to be built under the Isherwood system in British and Japanese yards, representing about 70,000 tons d. w., the total chip construction throughout the world, under the Isherwood system, would, therefore be about 4,820,000 tons d. w. Illustrating the extent of international adoption of the Isherwood system of construction, this figure more than doubles the total tonnage of steel ships reported building throughout the United States at the present time.

In connection with the extended adoption of this system of ship construction in the United States, it may be of interest to the reader to note that Mr. J. W. Isherwood, its inventor, has established permanent offices and staff at No. 17 Battery place, New York City. These offices are in charge of Mr. J. W. Stewart, one of Mr. Isherwood's principal assistants, and formerly of his London office. On his recent visits to American shipyards, extending over the greater part of a year, Mr. Stewart has been accorded a most cordial reception on the Atlantic and Pacific Coasts, as well as on the Lakes. His experience in shipbuilding generally, and in the Isherwood system in particular, well fit him for the service he has undertaken as indicated in the further adoption of that system of construction in connection with his management of the American office.

JEFFERY'S MARINE GLUE

Jeffery's Marine Glue was discovered in 1840 by Mr. Alfred Jeffery. It will be seen that this well known product has a service record of seventy-seven years behind it. It has come to be a standard article in the truest sense of the word, and the name Jefferys is accepted the world over as a standard of excellence. L. W. Ferdinand and Company have issued an interesting booklet entitled "Marine Glue—What To Use, and How To Use It." A letter to this firm, at 152 Kneeland street, Boston, will bring one of these booklets and also an answer to any question in regard to the use of marine glues.

AN IMPORTANT PARTNERSHIP

One of the most interesting announcements recently made in the Western marine supply and machinery fields was that of the partnership between Mr. Dan E. Ford and Mr. Mark P. Geirrine. Mr. Gerrine hardly needs any introduction in Pacific Coast shipbuilding circles. He entered the employ of the Union Iron Works twenty-seven years ago at the age of sixteen, and from the position of stenographer steadily advanced to the responsible position of purchasing agent, from which he resigned at the first of the present year. The combination of Mr. Ford and Mr. Geirrine is a peculiarly strong one, since both men are possessed of unusual ability and both are known and liked from one end of the Coast to the other.

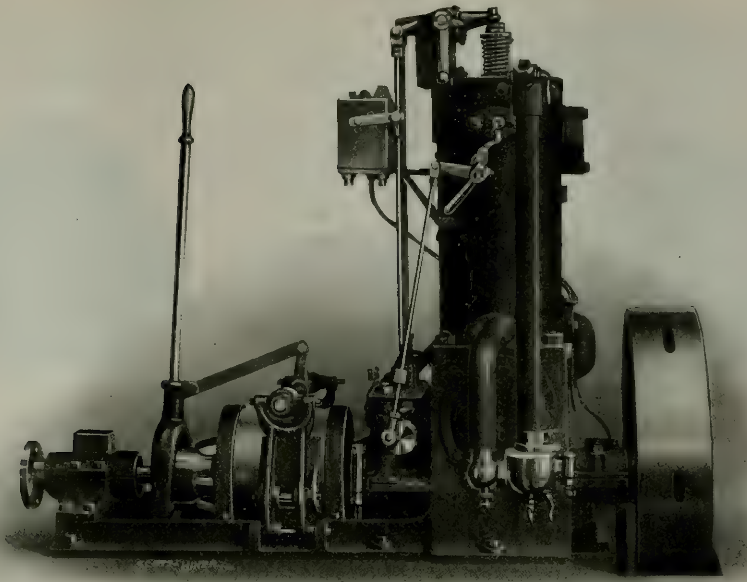
The elder member of the firm, Mr. Ford, served his time in the machine shops of the Shaw, Kendall & Hardy Company of Toledo, Ohio, worked in several other Great Lakes yards, went East and entered the employ of the Standard Oil Company and finally rose to be superintending engineer and naval architect for that concern. Later he became manager of the Superior Shipbuilding Company, a concern which was absorbed by the American Shipbuilding Company, now the largest shipbuilding firm on the Great Lakes. Leaving this firm, Mr. Ford again went East and superintended a large amount of new construction for the Standard Oil Company. He came to San Francisco in 1914 and opened offices in the Merchants' Exchange building and, securing a large number of high-class agencies for marine machinery and articles of equipment, he rapidly built up a large business.

The new firm of Ford & Geirrine has a splendid future before it and will occupy a prominent place in the list of those who cater to the requirements of the modern steamship.

OPENS PHILADELPHIA BRANCH

The Alberger Pump and Condenser Company has opened a branch at Philadelphia, with offices at 1418 Pennsylvania Building. This office is equipped to make surveys of plants, to furnish plans, drawings, specifications, and estimates, to contract for condensers, centrifugal pumps, Alberger-Curtis steam turbines, Wainwright heaters, expansion joints, Hammond water meters and other power plant accessories designed and manufactured by the Alberger Company. The office is in charge of Mr. H. W. Wetjen, as district sales manager, who is also manager of the marine department, and all negotiations for marine specialties will be conducted from the Philadelphia office.

New addition to the shops of the Atlas-Imperial Engine Company at Oakland, California. The new bay is 300 feet long by 80 feet wide.



The Atlas-Imperial Engine Company are producing a small launch and yacht engine such as is pictured above, which is making a splendid record in a large number of small craft.

A NEW PUBLICATION

The uses of open heaters in connection with the heating, metering, and softening of water for boiler and other purposes are exhaustively treated in a book issued by the Harrison Safety Boiler Works of Philadelphia. The amount of fuel that can be saved by the use of exhaust steam to heat feed water is first explained, and a convenient diagram is given by which the percentage of fuel saving in any given case can easily be ascertained. The essential parts of an open feed water heater are then considered, after which there are chapters on heating boiler feed in condensing steam power plants, including various arrangements to be used where the supply of exhaust steam is excessive or deficient, the effects of open heaters in connection with exhaust steam heating and drying systems, exhaust steam heating in connection with condensing steam power plants, including the use of bleeder and mixed flow turbines, the utilization of the open feed water heater as part of a hot process water softener, by which means it is claimed more complete and rapid removal of scale forming matter is obtained, the subject of softening boiler feed water in condensing power plants, the metering of feed water in open heaters, the heating of water for purposes other than boiler feed, and finally, there is a point by point comparison of the open heater, as represented by the Cochrane Feed Water Heater, with the closed or pressure type of heater, with suggestions for the specifications of an open feed water heater. This book covers in a very complete manner the important matter of handling feed water and exhaust steam and should be of value to those who design, manage or operate steam power plants.

INSTRUCTIVE FOLDER ISSUED

The Independent Pneumatic Tool Company, Thor Building, Chicago, Illinois, have ready for distribution their new circular, "Y," a four-page folder illustrating and describing in detail the Thor line of portable electric drills and grinders.

The Thor line of electric tools consists of eight different sizes of electric drills, with capacities ranging from one-fourth to two inches, and a portable electric grinder with a wheel three-fourths by 4 inches in size.

Thor electric tools are equipped with a universal motor (licensed under the Burke Universal Motor Patent) for operating on alternating or direct current, 110 or 230 volts. They are made with an aluminum cylinder, assuring extreme lightness, and have both ball and roller bearings and a specially constructed powerful motor, resulting in increased capacity. These electric tools are becoming very popular of late on account of the ease with which they may be carried from one job to another and their adaptability to various classes of work, all of which is described in the folder mentioned above.

LEAVITT DIVING ARMOR

An interesting diving armor equipment is manufactured by the Leavitt Diving Armor Company of Toledo, Ohio. The diving suit is built of manganese bronze with arms and legs of flexible copper tubing wrapped in pure rubber. The metal requires the requisite strength and is also rust proof. On the back is carried specially constructed apparatus which furnishes the diver with practically pure air for four hours. The arms are equipped with ball-bearing joints at the shoulders and wrists, as are also the legs at the ankles. The diver carries a pincher tool, which gives him a much stronger grip on objects than would be possible with armored fingers. In the helmet, which has glass windows, is a specially constructed telephone. The telephone wire is built right into the raising line, thus insuring uninterrupted communication with the surface. As the water pressure has no effect upon the diver within the armor, the apparatus can be lowered as fast as the winch or lowering device will pay out. Cooper-Hewitt mercury vapor submarine lights, such as are used in submarine photography, are utilized by the diver. There is but one line connecting the diver with the ship or barge from which he is working.

In a recent test, Mr. Leavitt, the designer of the armor, descended 361 feet in Grand Traverse Bay, Lake Michigan, and remained at this depth for forty-five minutes. When brought to the surface he showed none of the usual effects produced by great pressures. The Leavitt Diving Armor Company have accepted a contract to salve the steamer Pewabic, which was sunk in Lake Huron.

The Leavitt diving armor is being made from Parson's manganese bronze castings furnished by the Wm. Cramp Ship and Engine Building Company of Philadelphia.

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Any tube renewable from the furnace.
All tubes cleanable through the furnace door.
All tubes in sight from the furnace.
The most easily cleaned, maintained and repaired water tube boiler built.
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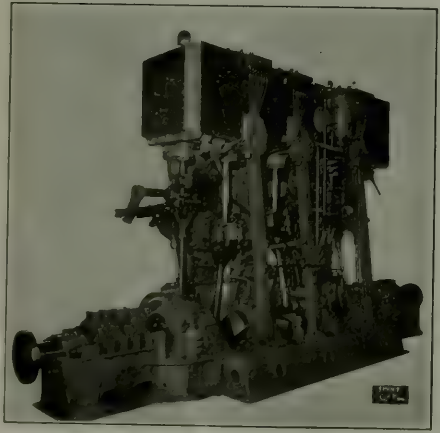

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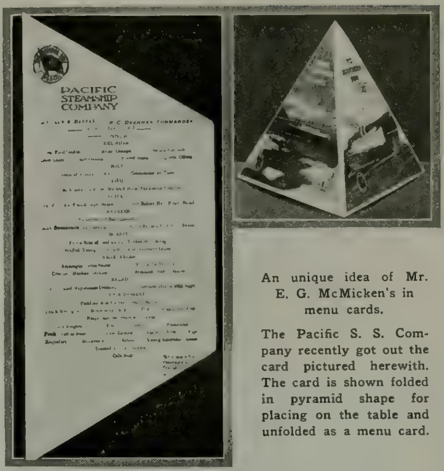
GOOD PUBLICITY

The Shepard Electric Crane and Hoist Company, whose plant is located in the small town of Montour Falls, New York, is carrying on an unique publicity campaign for the benefit of its employees. A weekly newspaper, the "Free Press" is uitlized for this purpose. The paper is one of long standing in the community, being in its twenty-seventh year. Under the heading "Shepard News" the Shepard Electric Crane and Hoist Company's employees and their activities fill the first page of the paper each week. The space is given over to social and athletic news, and also to the weightier matters of the Shepard Technical School, announcement of lectures by prominent engineers, etc. In recent issues the housing problem has been dealt with, the Shepard Company meeting the demands caused by its rapid expansion of business through a liberal and broad gauge development of a fine tract of home-site land.

A LONG-ESTABLISHED FIRM

One of the best known ship chandlery firms on the Pacific Coast is that of Weeks, Howe and Emmerson, now located at 90 Market street, San Francisco. This firm started business at No. 51 Market street thirty years ago, succeeding to the business of the oldest ship chandlery concern in San Francisco, that of A. Crawford and Company, who were located at the same address. This old firm operated in a wooden building and carried the most of its stock on the sidewalks. The police ordered the display inside, and the wooden building was condemned. A four-story brick building was constructed, and Weeks, Howe and Emerson succeeded A. Crawford and Company in the business. The building was destroyed in the fire of 1906, and after this disaster the firm bought out the business of H. C. Lassen and Company, who were located on Berry street, and who had the only ship chandlery store left in San Francisco after the great fire. So great was the demand that the stock of the concern was exhausted ten days after the doors were opened for business after the fire. A new building was erected at 51 Market street, and the firm of Weeks, Howe and Emerson moved back to its old quarters. Several months ago their lease was disposed of to the Southern Pacific Railroad Company, and a final move was made to 90 Market street. Owing to the revival of wooden shipbuilding caused by the war, Weeks, Howe and Emerson have sold more outfit for wooden vessels during the past twelve months than they did in the previous ten years. The present members of the firm are S. F. Weeks and C. K. Howe, they having purchased the interest of Mr. A. B. Emerson some six years ago.

Weeks, Howe and Emerson maintained a handsome exhibit at the Panama-Pacific Exposition, winning a gold medal. The exhibit, a picture of which is shown herewith, consisted of a miniature lake with canoes floating around in it, and a small bungalow housing some interesting ship chandlery exhibits.



An unique idea of Mr. E. G. McMicken's in menu cards.

The Pacific S. S. Company recently got out the card pictured herewith. The card is shown folded in pyramid shape for placing on the table and unfolded as a menu card.

NEW WESTINGHOUSE PLANT

Announcement has just been made by the Westinghouse Electric & Mfg. Company that the plot of ground recently purchased at Essington, near Philadelphia, will form a new industrial center for the Westinghouse Electric interests. The site embraces about 500 acres, with a frontage of approximately one mile on the Delaware river. Additional transportation facilities will be afforded by tracks from the Pennsylvania and Philadelphia and Reading Railroads.

This new center will be devoted to the production of large apparatus, the first group of buildings being for power machinery, principally steam turbines, condensers, and reduction gears. The initial development will cost in the neighborhood of $5,000,000 or $6,000,000, occupying about one-fifth of the area of the entire plot. The group will consist of the following buildings: Two large machine shops, an erecting shop for heavy machinery, forge shop, pattern and pattern-storage shop, and power house. Work will begin on these as soon as satisfactory building contracts can be let.

The number of employees to be engaged at the new plant has not as yet been definitely determined, but will number several thousand, and undoubtedly will in the future equal the number employed at East Pittsburgh, representing over 20,000 people.

The handsome exhibit of the Weeks, Howe and Emerson Company at the Panama-Pacific International Exposition. This exhibit won a gold medal.

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PACIFIC MARINE REVIEW

THE "PILOT SCHOONER"

From a Painting by F. S. Samuels

APRIL 1917

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☛ ARISTO TURBINE OIL LUBRICATES FIVE OF THE SEVEN "CURTIS GEAR REDUCTION TURBINE" EQUIPPED SHIPS RECENTLY BUILT ON THE PACIFIC COAST.

PACIFIC MARINE REVIEW

The National Magazine of Shipping

VOL. XIV, No. 4 APRIL, 1917

A Maritime Congress---Why Not?

FIVE YEARS ago the question of securing for the United States a foreign trade merchant marine commensurate with our importance as a world nation was a matter of indifference and apathy to the majority of the citizens of this country. Thoughtful groups of people here and there, in the interior as well as in the sea-bordering states, had long considered our position to be a dangerous one, and their fears for the trend of future events and their hopes of forestalling the dangers that lurked in the almost total dependence of the United States on foreign tonnage, gave rise to several strong merchant marine promotion societies. The work of these leagues was earnest and well carried out, but bore fruit very slowly. The fallacy that it was cheaper for the United States to have her exports and imports carried in foreign bottoms than in the ships of her own citizens was deep rooted. The American people figuring solely upon the maintenance and operating costs of a foreign trade merchant marine, decided that the monetary returns were insufficient and left the greatest carrying trade of the world to nations that were not slow in grasping the opportunity. The intrinsic value of owning their own delivery system, the insurance such a system would provide against interruptions in our foreign trade, and the absolute necessity of an ocean-going merchant marine should this country ever be forced into war with any great maritime power, were all heavily discounted by people who refused to look ahead further than the span of one governmental administration. This question, national in scope and paramount in importance, found a place in the platform of every political party, but the record of administration after administration proved that it was used for decorative purposes only—a sort of sleeping porch for the hopes of the advocates of an American deep-seas merchant marine.

The Awakening

The outbreak of the European war opened the eyes of the American people to their utter dependency upon foreign carriers. The man who raised hogs in Missouri suddenly woke to the fact that the merchant marine had more to do with hog culture than he had ever dreamed of. The wheat grower, the cotton planter, and in fact every producer who helped swell the excess production available for export, saw the problem in an entirely new light. Here was a struggle, every aspect of which was in America's favor as an exporting nation. No great war could be conceived of which would place the United States in a more favorable position for profiting from her foreign trade. Save for the remote possibility of submarine warfare effectively shutting off certain sea lanes, the great trade routes of the world were open. Losing her sea trade with two great powers, the commerce with the others grew by leaps and bounds. What it would have grown to and what profits would have accrued to this country had we been in possession of a great merchant marine beggars description. Great freight blockades in our Eastern seaports are eloquent testimonials of what might have been had we the ships to move it all. But there is another and terrible aspect of this "what might have been." Suppose that the naval power of the combatants in the great war had been equal. With German and Austrian cruisers scouring the seas and sinking or capturing every steamer bound to or from Great Britain, France, Italy, India, Australia, New Zealand and South Africa, and English and French cruisers performing a like service for all craft to or from Germany, Austria and Turkey, the result would have been an absolute paralysis of the foreign trade of the United States. Such a rude awakening as the United States received, mild though it was compared to what it might have been, was naturally productive of results, and these results bear all the ear-marks of the creations of a stampede.

The Shipping Board

Despite the urgent need for action, and despite the national nature of the problem, the fruits of our experience have been political rather than constructive, judicial rather than creative. A shipping act was passed by Congress and a Shipping Board named by the President or the President's advisers. According to the Act which brought it into being, this Board shall be non-political—that is, no more than three of any one political party shall serve on this body, which is composed of five members. Another case of the ostrich sticking his head in the sand and saying, "I am hidden." To say that a board is non-political and then practically demand that it shall be utterly controlled by whatever party happens to be in power is purely an American formula for non-partisanship. While many of the clauses in the Shipping Act under which the Shipping Board is operating are considered faulty and harmful by American shipping interests, it is far too early to predict either the helpful or hindering influences of the activities of this organization. This brings us naturally to the question, if our foreign trade shipping is a paramount issue in this country today, why is it that the shipping interests of the country and those who are either materially or sentimentally interested in America assuming an important place on the ocean cannot secure the passage of legislation of a helpful, constructive nature that will make investment in floating property stable and attractive instead of unstable and unattractive as it has been in the past, or attractive but unstable as it is at present?

While practically every great industry in the United States is indirectly interested in the building up of an American merchant marine, those directly, vitally and understandingly involved are the shipowner, the shipbuilder, and the shipper. If these three interests acting as a nucleus for an intelligent effort on the part of the maritime states, should form a coalition and work definitely with one end in view, there can be little doubt that many desired results could be brought about. Great as was the personal work of Mr. Andrew Furuseth, it was the backing of the American Federation of Labor that made the passage of the Seamen's Law possible. It would be just as possible for a close union of the shipping interests of the United States to secure legislation that they desired. If intelligent, concentrated effort turned one trick, it will turn another.

A Favorable Moment

No more favorable time for the cementing of interests dependent upon ocean carriage could be chosen than the present. The coast line of the United States will soon be greatly extended. The completion of the new Welland Canal will make the states bordering the Great Lakes maritime in every sense of the word since they will be able to become active competitors for the building of large ocean vessels. The channels of the upper St. Lawrence river will undoubtely be deepened and the canal locks enlarged to accommodate such craft. A glance at the map will show that bordering on these fresh-water seas there are six states, on the Gulf of Mexico there are four states, on the Atlantic seaboard there are fifteen states, and on the shores of the Pacific three states; twenty-eight in all, represented by fifty-six Senators, a comfortable majority in that branch of Congress. These same states furnish three hundred and thirty-four representatives, which is seventy-six per cent of the entire House. In other words, should sixty per cent of the Congressmen from seaboard and the Great Lakes states favor any merchant marine measure, and only twenty per cent of the representatives from the interior states vote with them, the measure would pass the House. Is it fair, then, to place the onus of the absence of an American foreign-trade merchant marine on the interior of this country? Is not lack of concentration on the part of the interests affected largely responsible for the fact that even when constructive legislation does make its way through Congress it is usually shorn of all its best features during the process and emerges as an unrecognizable phantom of its original contents?

Why Not a Maritime Congress?

If it is possible by intelligent and unceasing effort to produce a public sentiment that will result in the enactment of laws that will accomplish as much for the American foreign trade merchant marine as legislation can accomplish, then that effort should be made and should be made at this time before the lesson taught by the European war is forgotten.

How then is the desired public sentiment to be aroused and maintained? In the West we have the trans-Mississippi Congress, which has resulted in starting and fostering many congressional enactments that have proven beneficial to the Western part of our country. Why not have a maritime Congress similar to this body and made up of delegates from those states bordering on the Atlantic and Pacific oceans, the Gulf of Mexico and the Great Lakes? Such an organization could hold its conventions in some central location such as Chicago or Cleveland on the Great Lakes, or

New Orleans in the South. The method of selecting delegates to such a body would be of little importance providing that it insured the presence of men who really understood the needs of the American shipowner, the American shipbuilder and the American shipper. Such a body could formulate an American maritime policy which all the interests involved could get behind, there would be no more working at cross-purposes, and a thoroughly awakened public would soon let Congress know that American built, American manned and American owned ships must assume a place in our carrying trade commensurate with the wealth and dignity of a great nation.

EXCESS PROFITS TAX

American people have been hearing a great deal about excess profit taxes during the past year or two, although it is doubtful if they realized that our own Government was so quickly to turn to this source of additional revenue. The excess profits clause is carried in H. R. 20,573, approved March 3, and entitled "An Act to provide increased revenue to defray the expenses of the increased appropriations for the Army and Navy and the extensions of fortifications, and for other purposes." The gist of the excess profits measure is as follows:

Title II.—Excess Profits Tax.

Sec. 200. That when used in this title—

The term "Corporation" includes joint-stock companies or associations and insurance companies;

The term "United States" means only the States, the Territories of Alaska and Hawaii, and the District of Columbia; and

The term "taxable year" means the twelve months ending December thirty-first, except in the case of a corporation or partnership allowed to fix its own fiscal year, in which case it means such fiscal year. The first taxable year will be the year ending December thirty-first, nineteen hundred and seventeen.

Sec. 201. That in addition to the taxes under existing laws there shall be levied, assessed, collected, and paid for each taxable year upon the net income of every corporation and partnership organized, authorized, or existing under the laws of the United States, or of any State, Territory, or District thereof, no matter how created or organized, excepting income derived from the business of life, health, and accident insurance combined in one policy issued on the weekly premium payment plan, a tax of eight per centum of the amount by which such net income exceeds the sum of (a) $5,000 and (b) eight per centum of the actual capital invested.

NEW WAR RISK BUREAU RATES

The present relations between the United States and Germany has necessitated a readjustment of the Federal war risk bureau insurance rates. On March 21 a flat rate of three per cent was fixed for all vessels and cargoes passing through the war zone. Details of rates on routes that do not touch the war zone are as follows:

Between Pacific Coast ports, one-eighth of one per cent; between Pacific ports and Hawaii, one-fourth of one per cent; between Pacific ports and the Far East or the west coast of South America, one-half of one per cent; between Pacific ports and the Panama canal, one-fourth of one per cent; between Pacific Coast ports and Atlantic Coast of the United States, one per cent; between Pacific ports and the west coast of Mexico or Central America, one-half of one per cent.

Between Atlantic Coast ports, one-fourth of one per cent; between Atlantic Coast ports and Central American east coast ports, three-fourths of one per per cent; between Atlantic ports and the West Indies, half of one per cent; between Atlantic ports and the east coast of South America, one and one-half per cent; between Atlantic ports and Cuba, half of one per cent; between Atlantic Coast ports and Mexican Gulf ports, three-fourths of one per cent.

U. S. CHAMBER OF COMMERCE

The following statement has been issued by Elliot H. Goodwin, Secretary of the Chamber of Commerce of the United States, referring to the "Mattie Newman," an American vessel now said to be in the harbor at Liverpool:

"According to newspaper dispatches, 'the case was laid before the Shipping Board by the Chamber of Commerce of the United States' and further: 'Officers of the Chamber of Commerce and members of the Shipping Board consider the case an invasion of American rights.'

"Both statements as regard the National Chamber are incorrect. First, the case was laid before the Shipping Board by the owners of the vessel, a Boston firm. It was because of difficulty in securing any reply from the Shipping Board that this firm, which is an individual member of the Chamber of Commerce of the United States, applied to the Chamber to help in securing a ruling. The owners never submitted any protest in the matter at all. They asked and have always asked to be allowed to sell the vessel in England at a price which represents more than they paid. The Chamber has never had the matter brought before it and such officers of the Chamber as have inquired into the case at the Shipping Board have been unable to consider it 'an invasion of American rights.' "

Panoramic view of Honolulu, the "Cross Roads" of the Pacific. Shipping gathers here from every quarter of the world.

The Port of Honolulu

By J. E. Sheedy

THE Hawaiian group consists of the five principal islands of Kauai, Oahu, Molokai, Maui and Hawaii, and many smaller ones, forming a chain extending in a general northwest-southeasterly direction for about 450 miles.

Honolulu, the "Crossroads of the Pacific," is the capital of the Territory and the principal port in the Hawaiian Islands, situated on the south coast of the Island of Oahu in latitude 21°50′ north and longitude 157°30′ west, about 2100 miles from San Francisco, 4600 miles from Panama, 3400 miles from Yokohama and 4400 miles from Sydney—without doubt a port of magnificent distances and the only port of supply in the North Pacific, in an area about 5000 miles by 8000 miles, the largest area of the globe supplied by one port.

Honolulu is a modern city of about 65,000 residents, fast becoming a popular all-the-year-round tourist centre, thousands visiting Hawaii yearly. Its charms are being given a great deal of publicity, and the people of the United States are awakening to the climatic and scenic attractions of the Hawaiian group, with its snow-covered mountains at whose feet is found the finest bathing in the world (the sea temperature being 72 to 76 degrees throughout the year), its wonderful active volcano of Kilauea, and its extinct volcano of Haleakal, its equable climate, where one lives in the open every day in the year—these appeal to the tourist and passengers to and from the Orient, who make the voyage via Honolulu—the "Sunshine Belt," as it is called. These are attractions which, though pleasant to write about, are slightly outside the scope of this article.

Honolulu is a port of call for nearly all the steamship lines operating in the Trans-Pacific trade. The list includes:

The Pacific Mail Steamship Company, operating between San Francisco, Japan, China and the Philippines;

The Toyo Kisen Kaisha, operating one line between China, Japan and San Francisco, and another line between China and Japan and the coast of Central and South America;

The Nippon Yusen Kaisha, operating through the Panama Canal to New York;

The Oceanic Steamship Company, operating between San Francisco, Honolulu and Australia;

The Matson Navigation Company, operating between Seattle, San Francisco and Hawaii;

The American-Hawaiian Steamship Company, operating between New York, San Diego, San Francisco, Portland, Seattle and Honolulu;

The Great Northern Pacific Steamship Company, operating its "Palaces of the Pacific" between San Francisco, Los Angeles, Hilo and Honolulu;

The Canadian-Australasian Steamship Company, operating between British Columbia, Honolulu and Australia;

The United States Transport Service. operating between San Francisco, Seattle and the Philippines;

The Union Oil Company, operating oil-tank steamers between the Pacific Coast and Hawaii;

The Associated Oil Company, operating oil-tank steamers between the Pacific Coast and Hawaii;

The Standard Oil Company, operating oil-tank steamers between the Pacific Coast and Hawaii;

The Inter-Island Steam Navigation Company, operating a fleet of sixteen steamers between the ports of the Islands.

In addition there is a large and increasing number of irregular vessels bringing lumber, fertilizing material and coal; and also an increasing number of through vessels from the Pacific Coast to Australia and other Southern colonies which stop at Honolulu for fuel and other supplies.

There are also, from time to time, numerous naval vessels of the United States and of foreign countries calling at Honolulu, a naval station and fortifications being located on outskirts of the city.

Following the opening of the Panama Canal tramp steamers in great numbers began to make

The shore line around Honolulu is very bold, the islands being mountainous and in many places presenting precipitous cliffs to the ocean.

Honolulu a port of call, the outbreak of the war serving to increase this number, enormous quantities of war supplies for the Russian armies going through Vladivostok for delivery over the Trans-Siberian Railway. It is doubtful if the augmented tonnage due to war conditions will in the aggregate exceed the tonnage which may be expected after the close of the war as the abnormal freights prevailing will force a quick readjustment just as soon as the tonnage tied up by the war conditions is released for commercial purposes.

This means an increase in the number of vessels calling for supplies at all ports in the Pacific.

Three years ago in anticipation of the opening of the Panama Canal, all Pacific ports were improving and enlarging their shipping facilities. High freights, or at least so considered then, were prevailing and shipowners were preparing for the boom expected in shipping following the completion of the Canal. Many of the well established lines, also several new ones, had announced their intention of going into the Pacific and predictions were freely made that ten years would see several lines circling the globe.

Honolulans were confident that, though Hawaii would not increase its shipping and commerce to the same extent as some of the mainland ports, the effect of the increase of business by other Pacific ports would be to also increase the business of the port of Honolulu, as the ships transacting this increased business of other ports would make Honolulu a port of call for supplies.

Honolulu's position is ideal, situated as it is at the intersection of two of the great trunk routes of the world's ocean traffic, but Honolulu was not depending on its natural advantages alone. Long before the opening of the Canal, and of course before there was a suspicion of the European conflict, Honolulu was preparing for the increased tonnage expected.

Due to its position it may in time become a large distributing centre or trans-shipping port, but it never will be a great import or export centre,—a feeder port in a world sense, such as San Francisco or Seattle, as it has not the territory or population behind it.

Mail steamers may come and go but 75 per cent of the world's commerce today is carried in tramp steamers, whose owners must see some financial return for making any port of call. To attract these steamers, Honolulu not only had geographical and climatic—natural—advantages to offer, but it also offered low port charges, coupled with facilities for the rapid fueling, dry docking and repairing of ships.

The route from Panama to Yokohama via San Francisco and Great Circle is 266 miles shorter than via the southern route making Honolulu a port of call, but by the central route south of the Great Circle, which is the route usually followed, the distance is only eleven miles shorter than via Honolulu. This difference is nothing compared to the advantage to low-powered vessels of steaming through smooth seas and gentle winds such as prevail on the southern route. This is well illustrated by the many vessels, which, bound to the Orient over the northern route, limp into Honolulu every winter in distress, sorely in need of supplies and repairs.

There is never any trouble in making a landfall in Hawaii, fog is unknown and there are no obstacles to navigation.

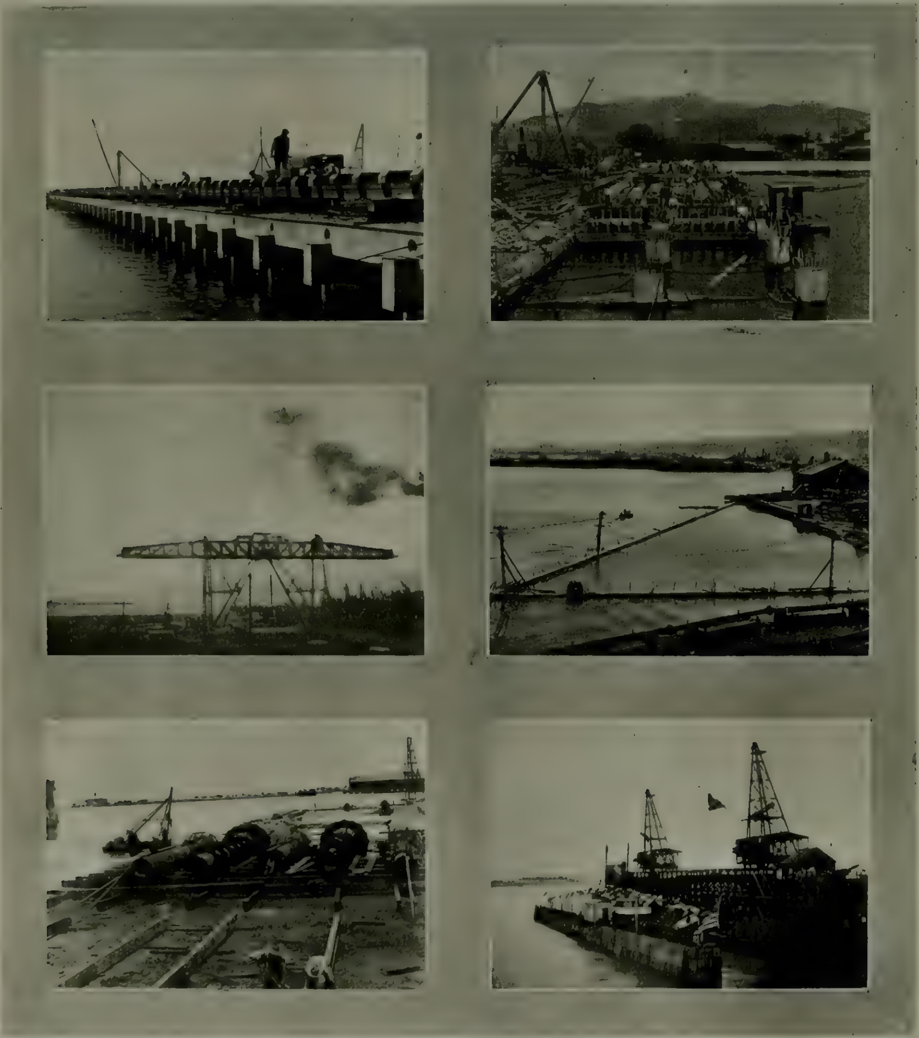
Honolulu Harbor is a natural harbor, having an entrance channel 400 feet wide, half a mile long and with 35 feet of water at low tide; the tidal range being 1.8 feet. The harbor proper has an area of about 100 acres, having a width of about 1500 feet, and a length of 3500 feet. Honolulu has northeast trades for fully eleven months of the year, and the harbor being on the south side of the Island of Oahu is well protected.

At the time of writing the harbor has twenty wharves which can accommodate ocean steamers. All of these wharves are built of wooden piles carrying the familiar cap and stringer decking, with various types of wearing surfaces.

The numbering of wharves starts at entrance of harbor.

Pier No. 1 is the only concrete wharf at present in use, being the landing and berthing place for mine-planters and other vessels under U. S. Army control.

The district allotted to Pier No. 2 is at present only partially developed. Pier No. 2 is an old wooden wharf used by sailing vessels in discharge of lumber cargoes. The Board of Harbor Commissioners is preparing plans for a modern concrete structure to be equipped with the latest lumber handling machinery.



A group of Honolulu waterfront pictures: Upper left, Pier No 8, showing fender under construction; upper right, construction work on Pier 8; center left, 150-ton floating crane of the U. S. Navy; center right, construction work Pier 9; lower left, cylinders used under Piers 8, 9 and 10; lower right, a busy corner in the harbor.

Piers Nos. 3 and 4 are the property of the Inter-Island Steam Navigation Company and are devoted to the coal handling, floating dock and ship repair plants of the company. These facilities are fully described in a later paragraph.

Piers Nos. 3 to 15 (inclusive) are located along the northerly side of the harbor.

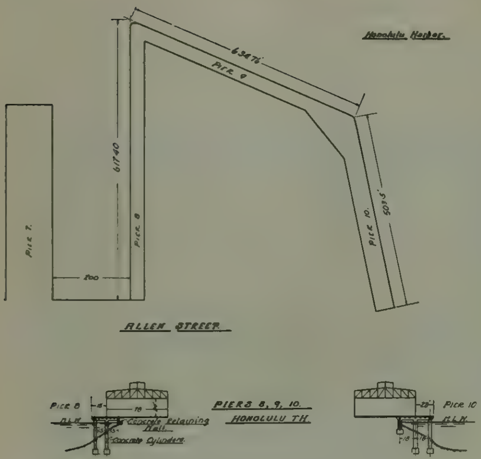
Piers Nos. 4, 5 and 5-A are devoted to the Federal Service under control of the U. S. Navy Department, and are used for berthing Government vessels. Army Transports plying between the Orient and the Pacific Coast use these docks, also. The Cruiser St. Louis and a flotilla consisting at present of four class K submarines with the mother ship "Alert," the Naval Tug "Navajo," and the Lighthouse Tender "Columbine" are regularly stationed in Hawaii with Pearl Harbor as base and moor regularly at Piers 5 and 5-A. The German Cruiser "Geier" and Tender "Lockson" are interned in Honolulu alongside these navy wharves.

Piers 6 and 7 are built on coppered fir piling with wooden decking and generous sheds, and offer the berthing space to most of the trans-Pacific liners. On Nos. 6 and 7 are two-story sheds, having passenger galleries along second floor, allowing clear freight space for the full width of the shed.

Scenes in Honolulu: Upper Pier 15 shore end and Pier 6 from the harbor; below these, shore end of Pier 12 and the Associated Oil Company's storage station; lower center, the Standard Oil Company's station and a busy section of the waterfront; Bottom, two styles of shed front on Honolulu wharves.

The slip between 6 and 7—200 feet wide—is popularly known as the Alakea slip and is equally noted, especially amongst sport lovers, as the scene of the making of many world records, principally by Duke Kahanamoku, Hawaii's world's champion swimmer.

Piers 8, 9 and 10, now under construction will be of reinforced concrete throughout, the main body of the wharf resting on a hydraulic fill enclosed by concrete retaining walls, and the over-hanging portion being supported on heavy reinforced concrete cylinders which secure their bearing from



Plan and sections of Piers 8, 9 and 10, Honolulu.

wooden bearing piles driven to refusal and cut off below the lowest level of used activity.

When completed these three wharves will provide berthing facilities for three large liners at the same time. On these piers, two-story reinforced concrete sheds will be erected to accommodate passengers and freight. The second floors will include exhibit and recreation features, similar in design to the modern piers in mainland ports.

Pier No. 11 is also a landing pier for lumber cargoes and is soon to be replaced by a reinforced concrete wharf

Piers Nos. 12, 13 and 14 are used exclusively by the local steamship company, and over these piers nearly all imported freight passes in trans-shipping to the various Island ports.

Pier No. 15 is a general cargo dock used principally by Matson Navigation Company as a passenger and freight terminal.

Pier No. 16 is devoted principally to fertilizer incoming and as a storage depot for sugar arriving on local steamers and awaiting shipment.

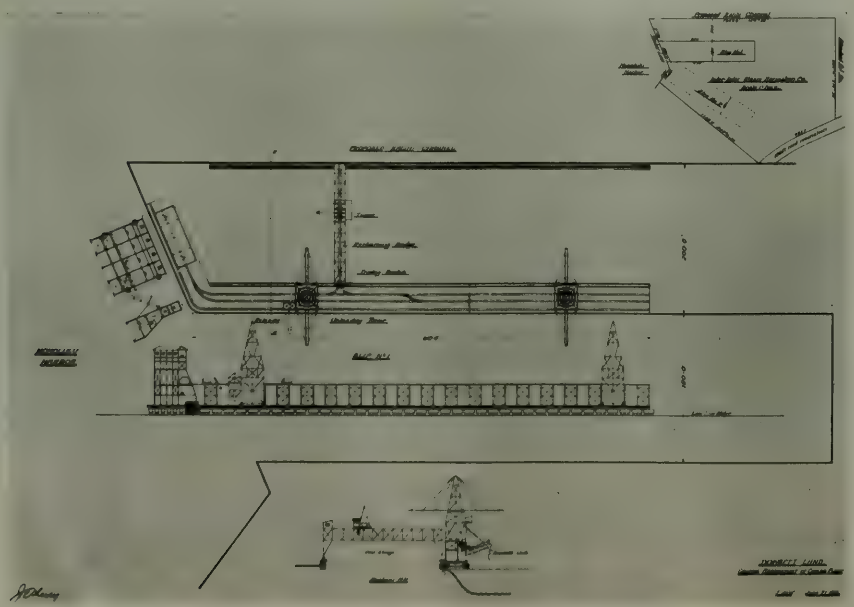
Pier No. 17 is a railroad wharf on which all live stock is landed. The wharf is 1200 feet long, and has fuel oil discharge lines along its entire length, all oil coming to the Islands passing over it.

Piers Nos. 18, 19 and 20 are railroad owned wharves. No. 18 is used for incoming freight almost exclusively.

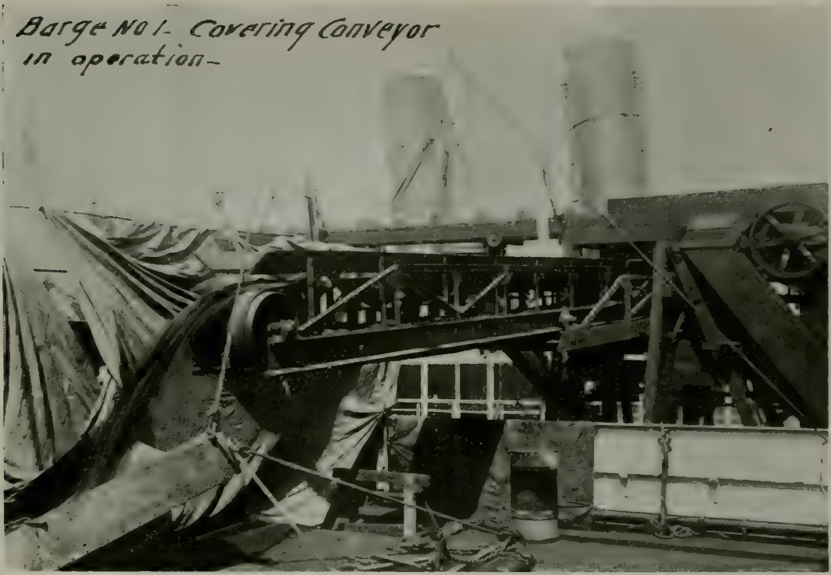
The principal exports from Hawaii are sugar and pineapples, the crop for the season of 1916 being 590,000 tons of sugar and 2,500,000 cases of pineapples.

All of the sugar originating on the Island of Oahu is loaded on trans-Pacific steamers at Piers Nos. 19 and 20, the wharves of the Oahu Railway & Land Company, and these wharves are equipped with a system of conveyors. A good deal of the sugar originating on the other Islands is shipped direct but most of it comes to Honolulu on the local steamers and is either discharged direct into trans-Pacific steamers or on to the wharves for storage.

For handling sugar from steamers to storage, Piers Nos. 19 and 20 are equipped with elevator conveyors, which feed into distributing flight



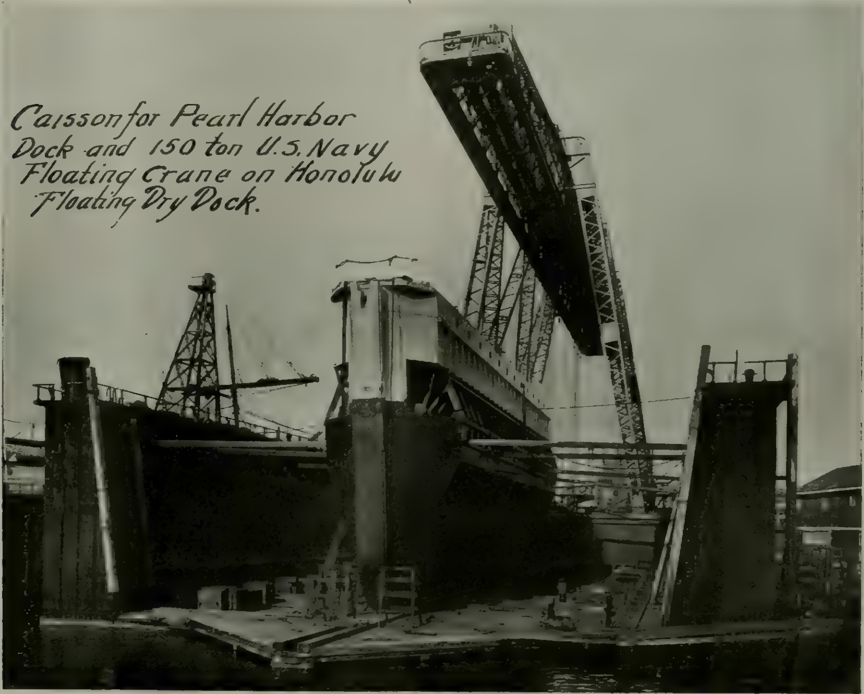
Dowsett Land. General Arrangement of Coaling Plant.



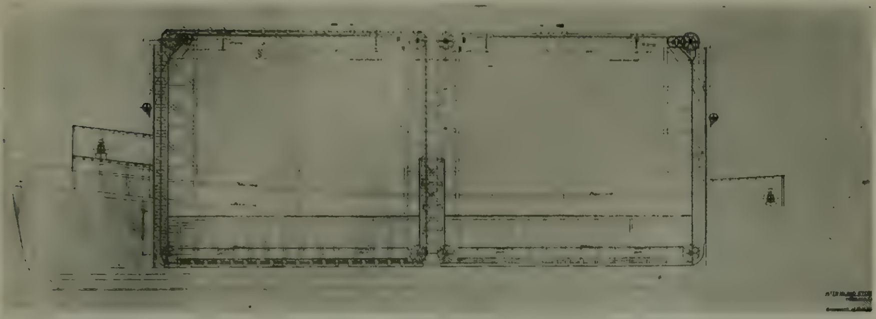
Barge No 1- Covering Conveyor in operation-

conveyors delivering into chutes in the storage space wherever required. Sugar from storage to steamers is handled in the same way, by a system of flight conveyors travelling through floor of warehouse and feeding into elevator conveyors, which in turn feed into flight conveyors delivering to chutes, discharging into portable spiral chutes in the various hatches of the vessels.

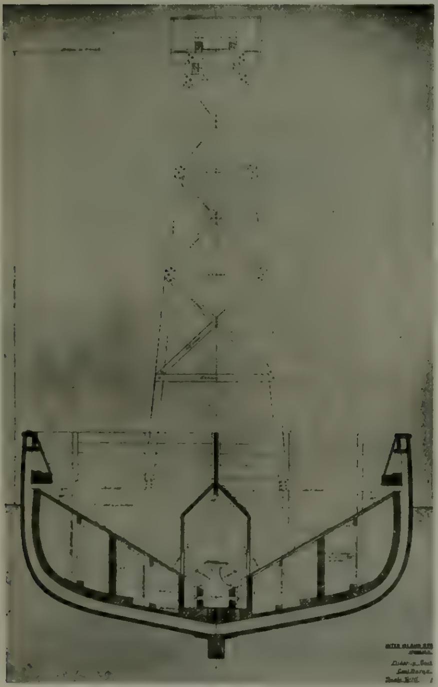
Throughout the warehouses are fitted with portable conveyors and elevators for piling and storing. Gravity roller conveyors are also used extensively for handling canned pineapples and other case



Caisson for Pearl Harbor Dock and 150 ton U.S. Navy Floating Crane on Honolulu Floating Dry Dock.



Longitudinal elevation of the Inter-Island Steam Navigation Company's coal barge No. 2.



Midship section of coal barge No. 2, Inter-Island Steam Navigation Co.

goods from railroad cars to storage or ship and from storage to ship.

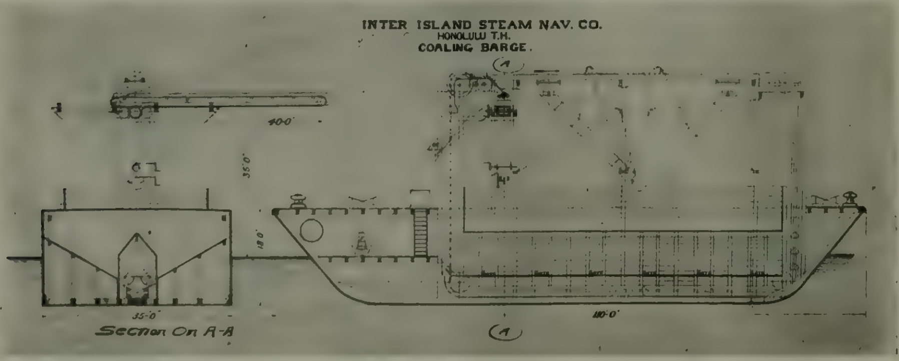
These wharves are included in the yard and terminal system of the Oahu Railway Company, all warehouses having railroad tracks throughout storage.

On all other wharves, all freight is handled by ship's gear and derricks. However, the bulk of the freight is sugar and pineapples, handled almost entirely by vessels making Honolulu a terminal port, all of which load at the railroad wharves.

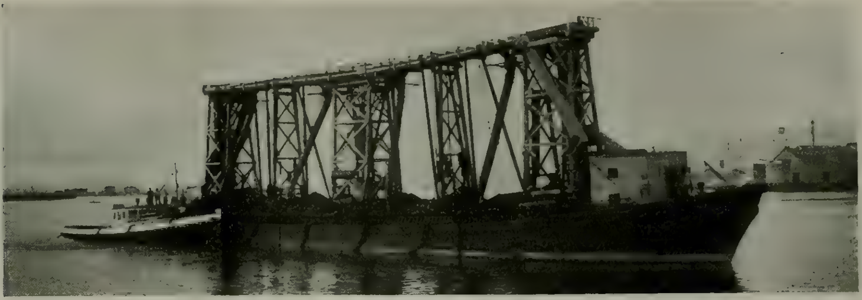
For the vessel making Honolulu a port of call only, Honolulu offers facilities unsurpassed on the Pacific. Practically all vessels calling at Honolulu take fuel as they must of necessity have travelled at least 2100 miles with the next port at least that distance—usually twice that.

For this reason coaling facilities have been given a great deal of study with the result that they are without doubt the best in the Pacific for commercial purposes.

The Inter-Island Steam Navigation Company, Ltd., has a coal handling plant on Pier No. 3 and adjacent property. This plant was installed about eight years ago, the coal towers, hoisting machinery and transfer system all being supplied by the C. W. Hunt Company of New York City. This plant consists of two steeple discharging towers,



Longitudinal and midship sections of coal barge No. 1, showing the central tunnel.

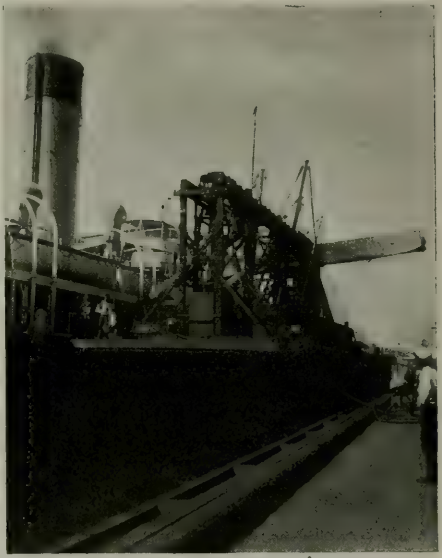


Inter-Island Steam Navigation Company's coaling barge No. 2, in Honolulu harbor.

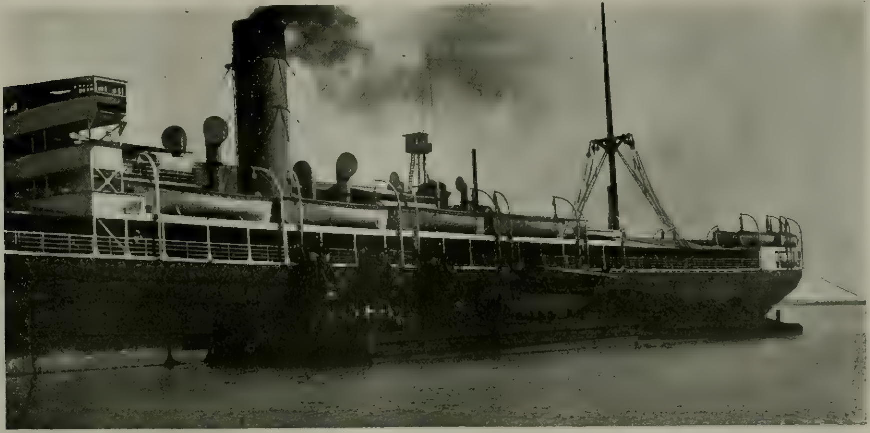
one reclaiming and reloading through tower and a cable transfer system hauling two and one-half ton cars.

The unloading towers, having a capacity of 100 tons each per hour, discharge into side dump cars of the well-known Hunt design, these cars being hauled over a cable-way of 3000 feet travel to the storage ground. Stocking of coal is done by the reclaiming tower entirely, the present storage capacity being about 30,000 tons.

The coal wharf is just inside the harbor proper, being an easy approach from the channel and has 30 feet of water in slip at low tide. Alongside the coal wharf are the usual coaling chutes which will deliver 25 feet out from wharf and 18 feet above low water. The dock is also equipped with two belt conveyors for bunkering ships, one of these being for use on vessels in the slip and one for smaller vessels coaling at the end of the wharf. The slip conveyor is so made that it can be projected across the vessel's deck, so as to deliver coal to hatches on off-shore sides of vessels. It will deliver coal 30 feet out from the wharf and 25 feet above low water. The conveyor at the end of the wharf elevates coal to the bunkering



Steamer "Anyo Maru" coaling at Honolulu in 1913. ne side using automatic conveyor, the other side a barge and manual labor.



Steamship "Anyo Maru" coaling. This picture was taken at the same time as the one above, only one coaling barge being in service at that time. Note the difference between the two methods both as to cleanliness and the number of men employed.

High trestle carrying water flume, a frequent sight in the Hawaiian Islands.

vessels from which it is discharged by gravity chutes to the same elevation as the slip conveyor.

All coal coming into Honolulu other than government supplies is discharged over this wharf. The local steamers all coal at the chutes here—and occasionally whenever all floating equipment is in use, tramp steamers are bunkered here also. This is only when vessels would suffer delay through waiting for the coaling barges to finish coaling other steamers.

The Inter-Island Steam Navigation Company, Ltd., has at the present time three coal barges in operation. Two of these are self-trimming, automatic conveyor barges, designed for special needs of Honolulu commerce.

The first of these conveyor barges was described in the June (1914) issue of the Pacific Marine Review. The No. 1 Barge is 110 feet long and 36 feet beam, having a capacity of 540 tons of bituminous coal. The barge hold is divided into six pockets, having metal lined bottoms inclined at an angle of 40 degrees and along the center line for full length of barge is a tunnel through which the conveyor travels. The pockets are self-trimming and the conveyor is designed to handle coal of any size.

No. 1 barge was built for the purpose for which it is used, but No. 2 barge is the converted schooner "Robert Searles," having dimensions of 183 feet by 38 feet by 13 feet 6 inches.

No. 2 barge has a bunker capacity of 1250 tons per hour and is equipped with two gravity elevator conveyors similar in design to that of No. 1 barge. These conveyors are independent of each other in every way, having independent engines, etc., giving double the discharge capacity of No. 1 barge. No. 2 barge has been subdivided into twelve pockets varying in capacity from 60 to 150 tons each.

In operation the conveyors have a discharge capacity of 100 tons each per hour, so that No. 1 barge delivers at the rate of 100 tons per hour and No. 2 at 200 tons per hour.

In actual practice, this has been greatly exceeded when it has been possible to keep conveyors going steadily—the bunkering rate of course depending entirely on the vessel and the rate at which the coal can be trimmed.

Both barges are complete self-contained units in every way. The motor power is a 30 h.p. Standard Gas Engine connected by belt drive and suitable clutches to the conveyor counter shafting. Extra large centrifugal pumps are placed in these barges and driven from the counter shafting of the 30 h.p. engine so that in case of any leakage it can always be controlled. This is quite essential as the barges work alongside ships in all kinds of weather and the work they do is rather hard on hulls.

The barges are lighted throughout by gas engine-driven generators of ample power for the tunnel lights and whatever arc lights are necessary for the proper lighting of the deck and bunkers.

Windlass and winches are power-driven through gearing from conveyor engines, and the barges are handled with very small crews.

Barges are kept filled at all times so that any vessels calling for coal receive immediate service, it being the custom to have barges tie up to steamer just as soon as the steamer has a line ashore and coaling goes ahead immediately, day or night, Sunday or holiday. These barges were developed by the writer and since their completion have been operated under his direction. They have proven very satisfactory in every day operation,

The old coaling plant of the Inter-Island Steam Navigation Company.

Coaling at Honolulu. With conveyor barges whose practical capacity is only limited by the ship's ability to stow and trim the coal, no time is wasted in bunkering.

both to their owners and to the companies owning vessels to which they deliver coal. This has been particularly true of passenger steamers. Previous to the use of these barges, all passenger decks of vessels were enclosed in side curtains and awnings in a vain effort to keep dust out of living quarters. This is a thing of the past in Honolulu and it is a common sight to see passengers leaning on the ship's rail above the barges, apparently much interested in the dustless and manless coaling.

Between the railroad property backing Pier 20 and the reserved channel to Kalihi Basin lies the thirty-five acre tract recently acquired by the Inter-Island Steam Navigation Company, Ltd., to be developed into a modern marine terminal.

At the time of writing, the dredging of the first slip has been completed, the construction of the concrete pier to carry the coal handling plant is well on towards completion and the structural steel and machinery for coal handling system is already stored along the slip ready to be assembled, the contract for all this work having been awarded.

The slip now finished is 850 feet long, 180 feet clear width and has 32 feet of water at low water, the axis of slip being parallel to the Kalihi Channel. The Kalihi Channel is the United States reserved channel connecting Honolulu Harbor with a large basin about a mile from the harbor proper and which it is proposed to develop as commerce warrants.

View of the Inter-Island Steam Navigation Company's coal barge No. 1.

On the ground, 200 feet wide, between the limits of the Kalihi Channel and this slip in Dowsett Property, work is going ahead rapidly on the new coaling plant of the Inter-Island Steam Navigation Company. This plant at the outset will have a storage capacity of 60,000 tons, but it is so designed that this may be increased to 200,000 tons.

The wharf is of concrete, designed by Mr. W. T. Donnelly, Consulting Engineer of New York, Mr. M. B. Carson being Resident Engineer in charge of the work.

This wharf will carry a trestle, unloading towers, reloaders and bunkers, as shown in figure, all coal handling machinery being supplied by the C. W. Hunt Company of New York.

The end of the wharf along the harbor line will be 220 feet long and along this end there is to be a bunker of 500 ton capacity (for the present) and the usual chutes, etc.

The unloading towers have a discharge capacity of 200 tons each per hour and the reloaders along the slip will handle 150 tons of coal per hour into vessels.

There is also a storage and reclaiming bridge of 160 feet span having a reclaiming capacity of 200 tons per hour in connection with reloaders of same capacity, delivering 45 feet above low water and 30 feet out from face of wharf.

The transfer system installed on the trestle consists of five-ton motor cars hauling five-ton trailers and these cars run out on the reclaiming bridge and bottom-dump. In operation, the coal will be hoisted from the vessel's holds and discharged into hopper in the unloading tower from where it will be fed into the five-ton cars. The cars traverse the trestle and run out to the reclaiming bridge and dump or may run to the end bunkers and discharge on to gravity discharge conveyor which elevates the coal to the pockets at the top of the bunkers.

For reclaiming and bunkering, there is a third tower mounted on top of the reclaiming bridge with a capacity of 200 tons per hour. In operation this tower picks up coal from storage using a two-ton grab-bucket, dumps it in the hopper of the tower, and the coal is then fed through undercut gates into the five-ton cars. These cars carry

The S. S. "Mauna Kea," one of the Inter-Island fleet providing freight and passenger service between the islands.

to any point on the trestle and discharge into the reloader hoppers and the coal is then fed out of the belt conveyors to the discharge chute on to the reloader conveyor boom. This boom is arranged to elevate and lower, or to swing within certain limits horizontally. The coal may also be discharged from the cars into the gravity discharge conveyor at the end bunker, where it is elevated to the bunkers as mentioned before.

The entire system will be electrically operated, the trestles are of steel, and the wharves of concrete, making it as near permanent construction as possible.

When this plant goes into operation, Honolulu will have coaling facilities far ahead of anything in the Pacific.

All the principal oil companies have tank stations at Honolulu adjacent to the new coaling plant. These tanks of all companies are connected to the Territorial fuel oil line running along the waterfront, branches leading to all wharves. A large supply of fuel and Diesel engine oils is kept on hand in addition to refined and lubricating oils.

A modern floating dock was put in operation in 1913 by the Inter-Island Steam Navigation Company. This dock has a length on keel blocks of 352 feet and a clear width inside wing of 76 feet, with a capacity of 4500 tons lift, the draft over blocks being 24 feet.

This dock is equipped with modern appliances and in connection with the shops, alongside, offers the very best facilities for hull and machinery repairs of all kinds, there being large carpenter, machine, boiler, blacksmith, and copper shops, oxy-acetylene, founding and galvanizing plants, equipped with modern tools for handling work of any size with dispatch.

This dock is designed to allow of increasing to 7000 tons capacity by adding pontoons and extending steel wings, and it is expected this will be done very shortly.

Several vessels too large to be taken completely out of water on account of being loaded have had stern raised and propeller, shaft, or rudder troubles repaired, this dock having great flexibility.

Among the vessels lifted for repairs to propellers or rudders are the "Wilhelmina," "Lurline," Transport "Thomas" and the "Ide Maru," all of these vessels being handled without discharging cargo.

This dock was described in the July, 1914, issue of Marine Engineering. It was built from the designs of Mr. W. T. Donnelly of New York under direction of the writer. Some interesting phases of work handled are shown in figures.

All harbors in the territory of Hawaii are under the control of the Board of Harbor Commissioners. The Board, of which the Honorable Charles

The "Great Northern" at her berth in Honolulu harbor. This vessel has been running excursions to the Islands from San Francisco and San Pedro.

R. Forbes is Chairman, is composed of five members, all business men of Honolulu, who serve without compensation.

The Board has drawn up a comprehensive plan for the development of the waterfront. One of the important features proposed is a belt railroad, connecting all wharves with the tracks of the Oahu Railway and the Honolulu Rapid Transit Company. The installation of the railroad will relieve the congestion of wharves at the head of the harbor and reduce the cost of handling miscellaneous freight.

The Board has declared its policy to rebuild, as necessary, all wharves of concrete, giving fireproof permanent structure and extensive works are now under way.

For the year ending June 30, 1916, the total exports were valued at $64,670,852.00, with imports of $6,068,529.00.

Of the exports, sugar amounted to 54½ millions and canned pineapples to nearly 7 millions. This represented a carrying trade valued at 34 millions for imports and 65 millions for exports, with total tonnage entered and cleared coastwise of 983,770 gross tons and 485,847 foreign.

These figures do not include transports, vessels calling for fuel or local steamers.

The total gross tonnage of all classes for the year ending July 30, 1916, was 3,745,984—quite a respectable showing for the port.

Honolulu is awake to the possibilities of the future—it realizes that it has the natural advantages and it is striving to build a port having facilities equaled by few and excelled by none.

THE FUTURE OF FOREIGN TRADE

This is the title of a remarkable address made by Mr. James A. Farrell, President of the U. S. Steel Corporation, before the Fourth National Foreign Trade Convention, at Pittsburg, on January 26, 1917. Mr. Farrell said in part as follows:

"It is significant that many of the orders for munitions now placed in this country provide that, should their fulfillment be interrupted by the close of the war, delivery will be taken of an equivalent amount of materials for peaceful purposes. Thus, as the war demand abates, our mines, forests and workshops will be drawn upon to aid in the reconstruction of great devastated areas and the re-equipment of ruined industrial plants. All this will mean new drafts on our surplus capital, but it will also mean prosperity to our productive industry, and thus will provide a profitable return on the capital it employs.

"It is difficult to realize the collosal scale on which Europe will have to borrow to make good the destruction of war. At least five billion dollars' worth of property will have to be replaced, and the demands of the work of reconstruction will be too vast to be met by private enterprise. The first demand will naturally be for houses to shelter the homeless thousands whose native villages have been reduced to shapeless ruins. The next will be for the surplus of such material, machinery and equipment as can be used to fabricate other machinery and equipment needed for industrial reconstruction and the introduction, where possible, of mechanical appliances to perform work which used to be done by hand. The process will not essentially differ from that pursued in the case of a factory destroyed by fire, whose owners, after rebuilding, first install the equipment needed to resume its most profitable production.

"In the presence of the gigantic needs of the war-swept territories in Europe and of their poverty-stricken populations, any application of the old-time methods of competition sounds trivial.

"Co-operation on the boardest and most generous scale, and in the most sympathetic spirit, must be the rule, if economic recovery is to be quick and thorough.

"The spirit in which our merchants, manufacturers and bankers addressed themselves to the relief of the sufferers by the historic disasters at Chicago, Baltimore and San Francisco, is the spirit of generous accommodation in which we must approach the needs of Europe after the war. Here, the path of devastation has had a broader sweep and more tragic accompaniments. The forces of destruction have been fed by draining the very life's blood of the nations in capital and man-power. Wealth has been lavished on the annihilation of wealth; the savings of one generation have been used to impoverish another. But from the whole ghastly conflict will emerge a regenerated Europe—a Europe with nobler ideals and higher standards of attainment, both in spiritual and material things."

The Shipping Board

A FOREIGNER regarding America's floundering attempts to create a body that will foster the interests of American shipping must immediately be struck with the remarkable fact that while the expert is eagerly sought for in the American business world he is studiously avoided by the Government. The Administration has created a shipping board and this body has apparently already gotten its feet into the mud with the intention of laying down and wallowing. If news reports are to be credited, the Shipping Board is to dive into a mass of lawsuits and revive the old muck-raking days.

Perhaps we are wrong, but it is our opinion that the proper province of a Shipping Board is constructive work. Sensible loadline legislation, the removal of the handicap on American ships in the matter of canal tolls and pointing the way to new lines of marine endeavor, these are the functions which such a board should fulfill. In the creating of such a board of commission of men capable of intelligently handling these questions, the Government of any nation but the United States would have turned to the natural source of supply,—the national society of experts in the line of knowledge required.

In this country we have the American Society of Naval Architects and Marine Engineers, a body of men who have been utterly ignored in two distinct cases. When the "Preparedness" wave swept over the country last year, this society received no invitation to co-operate with the Government in securing data. When the Shipping Board was formed, this natural source of supply for at least one member of that body was overlooked. We have seen a letter from Mr. Josephus Daniels, Secretary of the Navy, to the effect that he never heard of the American Society of Naval Architects and Marine Engineers. Now this may have been a little bit of pleasant sarcasm on the part of Mr. Daniels, or, on the other hand, it may be entirely true. The fact that practically every officer in the United States Navy who has made a name for himself either in this country or abroad is a member of the society in question, makes Mr. Daniels' words equally unfortunate whatever the viewpoint. You may term the remark foolish or assinine, the moral remains the same.

It will be remembered that one clause of the shipping act provides that American goods or shippers are to be in no way discriminated against by foreign ships. There is opportunity under this section of the act for innumerable court actions. As an instance of the class of cases the Shipping Board is going to try there is the case of the White Star-Dominion Line's apple shipments from Portland, Maine. From late in April to December 1st, the White Star- Dominion ships run out of the St. Lawrence and the other months of the year from Portland, Maine. At Portland these ships receive nearly their entire cargo from the Grand Trunk Railway. The White Star-Dominion Company has a contract for Canadian apple shipments which uses up most of their freight space for months at a time. They refuse to take American apple shipments because they have no space for them if they live up to their contract with the Grand Trunk System. Now the only reason the steamers of this line go to Portland, Maine, in the Winter months rather than from St. John, New Brunswick, is because of their agreements with the Grand Trunk lines. Now, we understand, the Shipping Board is to institute proceedings against the White Star-Dominion Line for discriminaton against American shippers. If these proceedings are successful the only losers will be the Grand Trunk Railway and the City of Portland. The Canadian shippers may be inconvenienced also; in fact, everyone concerned will be injured with the single exception of the concern against which the action has been taken. It does not look like a very sensible proceeding. Here we have goods of Canadian origin, shipped on a Canadian railway and carried away on a British-Canadian ship. In transit, the goods pass through a small section of American territory and are trans-shipped at an American port, thus giving an American city the chance to profit through at least one step of the transfer, the moving of the goods from rail to ship. The parties to the transaction are Canadian shippers, a Canadian railway and a British steamship line. What right has America to interfere in a case of this kind? Will the American shipper have a better chance to ship goods on a White Star-Dominion boat when she has been forced to sail from St. John than he has now when she is leaving Portland, Maine? If such cases as this one are to be the work of the Shipping Board, we need hardly look for any marked growth of the American Merchant Marine resulting from the labors of that body.

In the Congressional Record of February 24, we find several Congressmen indulging in a little sarcasm at the expense of the Shipping Board. The following are a few samples:

Mr. MANN. Mr. Chairman, the salaries of this Shipping Board, of course, are restricted by law. How many employees are they to have under this?

Mr. FITZGERALD. About 145.

Mr. MANN. What are these employees going to do?

Mr. FITZGERALD. The Shipping Board will

perform the many and manifold and various duties imposed upon it by the shipping act. One is to investigate discriminations against American commerce; to investigate complaints filed in regard to discriminations against American shipping, etc. * * * The Board has outlined a very comprehensive scheme of organization. It has detailed the kind of work it expects it will be required to do. Nobody can tell whether their estimate of what will be presented to them it accurate or not. They made one guess; we made another.

Mr. MANN. Well, here is the Tariff Commission, that has the most arduous work there is for any commission to perform. They get $300,000. It is proposed to give to these other people $500,000. Now, nobody knows what they are going to do, and the gentlemen cannot tell.

Mr. FITZGERALD. Well, they have $50,000,000 that they can spend.

Mr. MANN. Oh, no; they have not got 5 cents.

Mr. FITZGERALD. Well, they can get it.

Mr. MANN. That depends.

Mr. FITZGERALD. Unless it is all gone before they start.

Mr. MONDELL. I was not much in favor of the shipping bill, but I am rather favorably disposed towards the Shipping Board, because I have discovered that the Shipping Board as now organized proposes to make an earnest and, I hope, entirely successful effort to avoid doing some of the things for which it was organized.

I am sorry that I have not the time to read from the statement made by the Chairman of the Shipping Board, who appeared before us and gave us an outline of what he expected to do and what he hoped to be able to avoid doing which the law contemplated that he should do.

In connection with that statement, they presented to us an outline of their proposed organization, and surely it is going to be a splendid organization, for it is as artistic an outline of organization as I ever saw.

They start out with a division of investigation, the chief expert of which is to get $7,200 a year, and others along that line. The Chief of the Division of the Regulation of Transportation by Water is to get $7,500 a year. The Chief of the Law Division must be a good attorney and he is to get $800 a month. The naval architect, who is Chief of the Division of Vessels and Terminals, is to be content with the more moderate salary of $6,000 a year. The Chief of the Division of Shipping Management will have to struggle along on $1500 a month.

It will be noted that the expert naval architect attached to the Shipping Board is not worth much when compared to the lawyers. It is also apparent that the Shipping Board itself is entirely superfluous for, if the heads of the five divisions mentioned are to be really experts and not "deserving Democrats," or "deserving Republicans" when the Administration changes again, they would in themselves comprise a far better Shipping Board than their employers.

In the discussion anent discriminations against American shippers and American shipping, the following arguments were offered and it will be noted that the Shipping Board already has on hand material to keep it investigating for some time to come.

Mr. FITZGERALD. The statement made was that there were 4,000 complaints of this character now on file.

Mr. MANN. Of what character, may I ask?

Mr. FITZGERALD. Complaint of discriminations and regulations by foreign governments which affect American exporters and shippers.

Mr. MANN. Where are these on file?

Mr. FITZGERALD. In the State Department.

Mr. MANN. I am rather surprised that there are only 4,000 of them. What is the character of these complaints; what do they say the discrimination consists in?

Mr. FITZGERALD. For instance, we have this nature of complaints. Vessels refuse to take freight of American shippers unless the representative of another government gives a certificate that it can be taken on the ship.

Mr. MANN. The Shipping Board does not need to investigate that. Everyone knows that.

Mr. FITZGERALD. What the Shipping Board intends to do is to study during the war the conditions that exist and they believe may exist after the war. I shall read the statement of Mr. Denman, who is Chairman of the Shipping Board. He says:

"As we understand it, what Congress had in mind when it gave us this authority was that it wanted us to study during the war the conditions that would undoubtedly prevail after the war, when the European nations, having nationalized their resources, begin to compete with us as national units.

"You know about the bunkering agreements which they now have, under which they are squeezing everything into the line of their trade and the ways they want their trade to run our ships. I had a client in San Francisco who had a bill of goods for Manila. This man, of an American house, was on the blacklist, and was the largest American exporting house on the Pacific Coast outside of a certain foreign house. He wanted to send a bill of goods to Manila to an old customer. He found that the American steamship line going there would not take his goods, because the steamship line had a bunkering agreement with a certain European-owned port in China, which made them agree not to carry goods for a blacklisted person. Now, this was an American house, 50 years old, with a competitor who was a member of the legislative branch of a foreign government, trying to send his goods on an American steamship line to an American customer in the Philippines, and was not able to get it there."

That is an illustration of the situation by which Americans desiring to ship to places under the American flag by American steamships cannot do so because some foreign government objects to their sending their goods there.

Mr. MANN. We all know that, but what is the Shipping Board going to do? The State Department cannot do anything by diplomatic relations, what is the Shipping Board going to do, declare war?

It is nearly always difficult to arrive at anything definite in a perusal of the Congressional Record owing to the mania of Congressmen for cluttering up the record with more or less elegant persiflage, but, nevertheless, the point of Congressman Mann is well taken. Investigation of discriminations against American shippers and American ships, whether real or alleged, will lead us around the circle. The American merchant marine is growing at a respectable rate. This growth, it is true, is the outcome of extraordinary conditions,—conditions which in the not far distant future will probably be materially altered. A great deal of American capital will be committed to the sea and a steady increase in the foreign trade tonnage of the United States will be necessary to protect and conserve the capital now being lavishly invested. Complaints without remedies are useless. Legislation that is merely enacted for a retributive reason will not build up a merchant marine, but will cause our shipping to lean more and more heavily on the hollow mockery of statutes and laws until the lack of sound commercial foundations for these enactments becomes apparent and the structure crumble. A Shipping Board should find its real work outside legislation all together. Mr. Denman cites the failure of a San Francisco shipper to get a consignment of goods through to the Philippines owing to the shipper being on the blacklist and an American steamship line refusing the shipment in order to avoid trouble over a bunkering agreement at a foreign port. How can legislation hope to alter this? Proper encouragement to a direct American steamship line to serve American trade with the Philippines would settle the matter, however, and settle it in a manner that would checkmate any action on the part of the foreign government in question. If foreign nations use bunkering ports as a means to attain certain desired ends, American coaling ports in the same zones of travel would accomplish a like result for this country.

If the Shipping Board, as is stated in the Congressional Record, is to set about investigating 4,000 cases of discrimination it seems to us that its constructive opportunities will be neglected.

Marine Geared Turbines

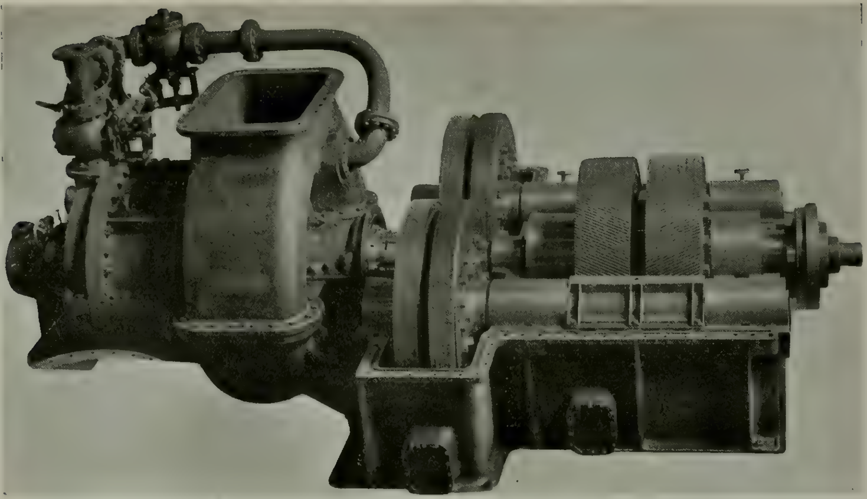
With Extracts from an Article by W. J. Davis, Jr.

CONTRARY to what might be naturally expected under the present abnormal demand for ships, owners are probably displaying as keen an interest in engine-room economies as at any time in the history of American shipbuilding. When the increased cost of producing a cargo carrier is considered and the possibility of world readjustments that will recreate competitive values before these high-priced carriers have off-set their first cost with sufficient surplus earnings to place them on an investment level with the old-time tramp steamer, it is self-evident that power plant economy will be more sought after than ever before.

During the past few years three distinct drives have appeared as rivals to the reciprocating steam engine for propulsion of cargo vessels. These three are the internal combustion engine, including Diesels, semi-Diesels and hot-bulb engines; geared turbines, and the latest and, in many respects, highly promising electric drive. As far as the direct turbine drive is concerned, it may safely be ignored as far as cargo vessels are concerned, as there seems to be no possibility of a steam turbine being devised that will show any economy at all at the low speeds necessary in the propeller speed of cargo vessels.

The Diesel engine has remarkable advantages over all others in the matter of initial fuel consumption, and this applies also to other internal combustion engines using crude or semi-crude oils. To a very limited degree, the internal combustion engine is subject to the same objection as the direct turbine drive for cargo vessels owing to the fact that most types of internal combustion motors operate at a higher speed than the most economical speed for large, cargo boat propellers. This results, of course, in the use of smaller propellers than would be fitted on reciprocating steam engines of the same power and the loss in efficiency becomes apparent when a cargo vessel with a small propeller or small propellers encounters heavy head weather. While the wonderful fuel economy of the internal combustion engine more than offsets this disadvantage, the matter is one which may eventually lead to the gearing down of the higher speed units in this class of drive.

That the geared turbine has come to stay as a drive for cargo vessels of all descriptions is evidenced by the great number of installations either in actual service or now under way in new American and foreign steamers. This rapid development has been made possible through the remarkable perfection attained in the construction of large gears. It was evident that gears for the transmission of large powers on shipboard, if possessing absolute rigidity, must succumb to the minute distortions in alignment that were bound to occur. The fact that this great drawback has been completely overcome through a certain flexibility of the gears themselves or their alignment, has resulted in the present favored position of the geared turbine today as a drive for cargo steamers and oil tankers.

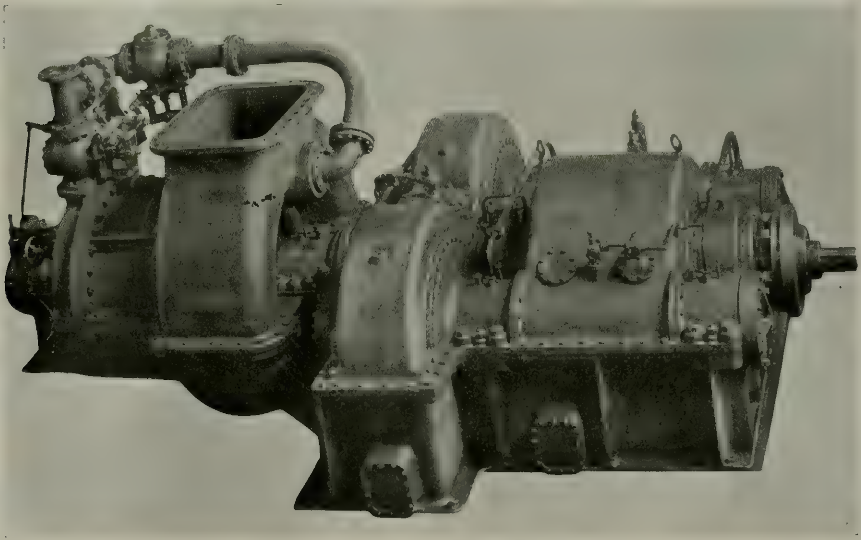


Curtis Turbine and one plane flexible type speed reduction gear for ship propulsion, top half of gear housing removed.

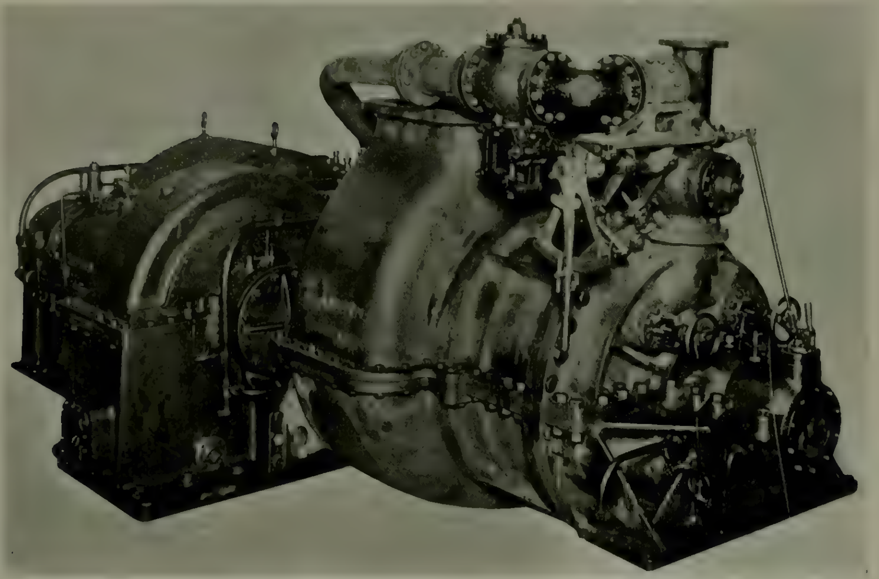
The electric drive has so far been confined to naval uses in this country, but it possesses economies and possibilities that must eventually secure for it serious consideration. Its adoption by the Navy Department as the drive for the new battle cruisers is causing widespread discussion and the controversy that is now going on will probably do much to clear the marine engineering world of speculation in regard to it. Mr. W. L. R. Emmet, who has been responsible for the greatest part of the development work in this country, makes high claims for the electric drive, and there can be no doubt that important marine engineering developments may be looked for along this line in the near future.

The great preponderance of the geared turbine as motive power for the big fleet of steel steamers being built on the Pacific Coast makes authoritative discussion on this subject extremely interesting at this time, and we take pleasure in producing here the major portion of an article by Mr. W. J. Davis, Jr., Pacific Coast Engineer of the General Electric Company, which appeared in the January issue of the General Electric Review. Mr. Davis states as follows:

The present activity in American shipyards due



Curtis Turbine and one plane flexible type speed reduction gear for ship propulsion with gear housing in place.



Curtis Turbine and one plane flexible type speed reduction gear for ship propulsion showing control.

to the extraordinary demand for cargo ships is of especial interest to engineers by reason of the large number of such ships which are to be driven by steam turbines with reduction gears. Although only a very few large steel freight-carrying ships were being built in this country before the war, within the past two years the Pacific Coast yards alone have built, or contracted for, sixty-five steel ships of 8,000 to 10,000 tons cargo capacity, of which more than fifty are to be equipped with geared turbines.

The first commercially successful steam turbine driven freighter, the S. S. "Vespasian," built in England and equipped with a 1000-h.p. Parsons turbine with reduction gear, was placed in service in 1909, but it was not until November, 1915, that the first American-built turbine freighter was commissioned. It is evident, therefore, that the steam turbine is now making substantial and rapid progress in a field in which the reciprocating engine has for many years been strongly entrenched.

The distinction of being the first cargo ship built in the United States to be equipped with the new drive belongs to the S. S. "Pacific," built by the Union Iron Works Company at San Francisco, and propelled by a 2400-h.p. Curtis turbine with Alquist flexible gears, manufactured at the Schnectady works of the General Electric Company.

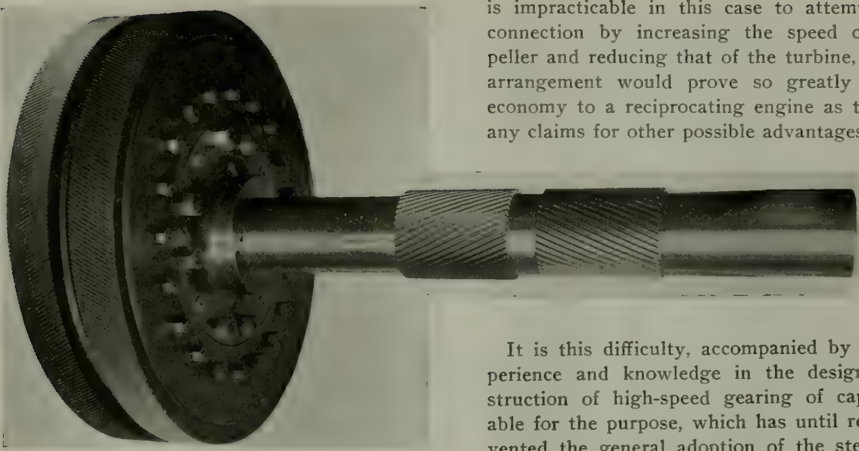
The steam turbine being essentially a high-speed machine, while the propeller of a ship must run at a low speed, it is obvious that an attempt to con-

TABLE I

S.S. "LOS ANGELES"

Record of fuel consumption for nine voyages—average gravity of fuel oil 16° Baume at 60° F. Average steam pressure boilers 205 lb. gauge. Average superheat 20° F.

Voyage	Total knots.	Average speed, knots per hour.	Total barrels delivered.	Barrels fuel used on voyage.	Total barrels per knot steaming.	Total barrels used in port.	Total bbls. per knot steaming and in port.	Pumping in port, hours.	Barrels discharged per hour.	Cost of fuel at 80c per bbl. per knot steaming and in port.
1	423.0	9.4	67,074	556	1.31	164	1.70	64½	1039	$1.36
2	1845.0	10.13	74,739	1656	0.897	218	1.01	33¾	2214	0.80 8/10
3	6549.0	10.22	73,734	5579	0.851	169	0.877	46¾	1577	0.70 1/10
4	220.0	9.1	72,592	221	1.000	123	1.56	41	1770	1.24
5	6348.0	10.60	72,538	5462	0.860	159	0.885	35	2072	0.70 8/10
6	9151.0	10.24	70,959	8293	0.906	186	0.926	52½	1351	0.74 1/10
7	450.0	10.70	75,761	375	0.833	167	1.20	42	1803	0.96 3/10
8	9086.6	10.76	70,214	7896	0.868	208	0.891	82	856	0.71 2/10
9	450.0	10.9	71,149	365	0.811	134	1.10	41¾	1704	0.88
Total	34523.0		648,760	30,403		1528		439¼		
Average		10.22			0.881		0.936		1598	



Intermediate shaft of one plane all flexible type reduction gear used with Curtis Turbine.

nect the turbine directly to the propeller shaft must result in a compromise in which the efficiency of both turbine and propeller must be sacrificed. In the case of very high speed ships, such as destroyers, certain classes of passenger vessels, etc., it has been possible to make such a compromise which would possess certain advantages in the way of increased speed, reduction in vibration and saving in weight which would overbalance the failure to give the best attainable economy in fuel. These advantages, however, would not apply to slow-speed, freight-carrying vessels, due to limitations of propeller speed.

As an example illustrating this condition, we may consider a freighter or tanker of 8,000 to 10,000 tons capacity with a speed loaded of 11 knots. Such a ship will require about 2500-h.p. to drive it. The most economical speed for the propeller would be about 90 r.p.m., while that for the turbine would be not less than 3000 r.p.m. It is impracticable in this case to attempt a direct connection by increasing the speed of the propeller and reducing that of the turbine, as such an arrangement would prove so greatly inferior in economy to a reciprocating engine as to outweigh any claims for other possible advantages.

It is this difficulty, accompanied by lack of experience and knowledge in the design and construction of high-speed gearing of capacity suitable for the purpose, which has until recently prevented the general adoption of the steam turbine drive in the propulsion of cargo vessels.

For eight or ten years a number of able and experienced engineers have been studying the problem of designing and cutting helical gears which would operate successfully under the conditions of high speed and large powers required of them for marine work. Several successful designs of gears and gear-cutting tools have been recently perfected and tried out in England on turbine propelled ships with excellent results in the way of economy and reliability.

The Alquist flexible gear as manufactured by the General Electric Company is particularly interesting amongst high-peed reduction gears in its mechanical features. The wheels for this type of gear are made up of rolled steel plates or disks, rigidly bolted together near the center and keyed to the shaft. Each disk is reduced in thickness between the hub and the rim sufficiently to give a small amount of flexibility in an axial direction, and to permit this movement a clearance of about ten-thousandths of an inch is provided between

TABLE II

S.S. "LA BREA"

Record of fuel consumption for nine voyages—average gravity of fuel oil 16° Baume at 60° F. Average steam pressure boilers 200 lb. gauge. Average superheat 37° F.

Voyage	Total knots.	Average speed, knots per hour.	Total barrels delivered.	Barrels fuel used on voyage.	Total barrels per knot steaming.	Total barrels used in port.	Total bbls. per knot steaming and in port.	Pumping in port, hours.	Barrels discharged per hour.	Cost of fuel at 80c per bbl. per knot steaming and in port.
1	650.0	9.5	62,578	574	0.883	142	1.10	36½	1714	$0.88
2	2037.0	11.33	73,600	1459	0.716	152	0.790	37½	1962	0.63 2/10
3	2108.0	11.01	73,318	1584	0.751	156	0.824	39½	1858	0.65 9/10
4	9254.5	10.97	71,154	6896	0.745	117	0.757	49¼	1438	0.60 5/10
5	450.0	11.2	77,292	321	0.713	134	1.01	39	1980	0.80 5/10
6	9196.5	10.65	71,824	6900	0.750	109	0.762	25	2660	0.69 9/10
7	9284.0	10.39	71,677	6875	0.740	107	0.752	31	2312	0.60 1/10
8	425.0	10.77	73,620	350	0.823	114	1.09	28	2629	0.87 3/10
9	9021.0	10.68	71,160	6720	0.744	83	0.754	26¼	2710	0.60 3/10
Total	42426.0		646,233	31,679		1113				
Average		10.72			0.747		0.773		1987	

the disks at their rims. As the gears are of the double helical type, this construction insures equal distribution of pressure along the face of the teeth. It will readily be seen that if the pressure applied by a pinion tooth at any point should exceed the normal pressure, the axial component will cause a slight axial flexure of the disk. Experience has shown that changes in alignment or slight inaccuracies in tooth-cutting or assembly of the gears, which would cause objectionable noise, loss in efficiency, high temperature and excessive wear of the teeth of solid gears, have little effect on the operation of the flexible disk type.

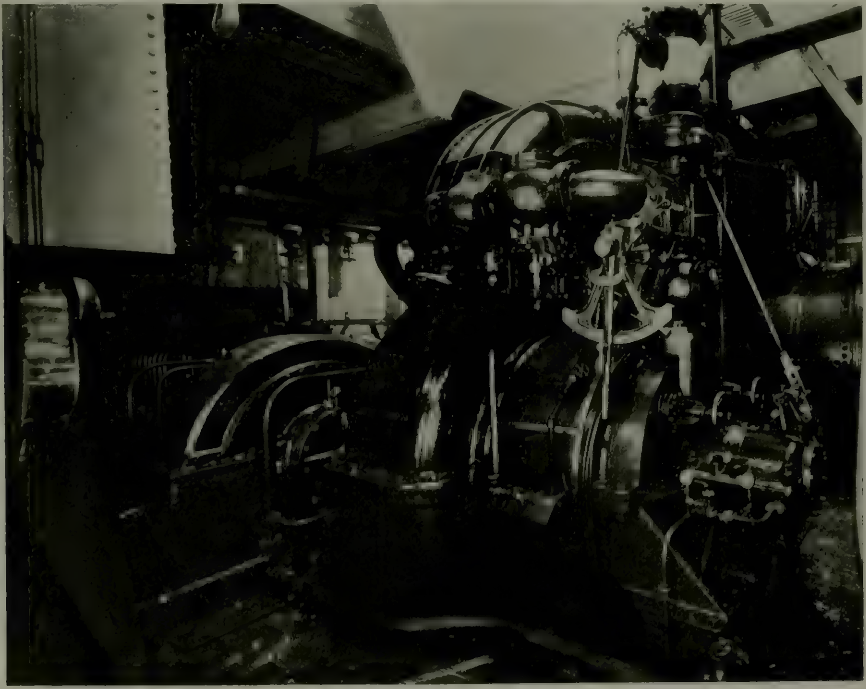
Accurate measurements of the teeth of the Alquist reduction gears on the S. S. "Pacific" show the wear of the flexible gear teeth to be almost negligible and that the life of the gears may be expected to be at least equal to that of the ship.

An interesting commercial feature of the present abnormal demand and production of steel cargo vessels in this country is the uniformity in capacity, speed and power requirements. This has made it possible for the ship yards to standardize in the matter of hull construction and power plant requirements. Fully ninety per cent of the turbine ships completed or under construction by the Pacific Coast yards are provided with turbines of the same type and practically of the same size, namely, 2400 to 2600-h.p. A description of one may, therefore, be held to apply to all.

The ahead turbine is designed to run at 3380 r.p.m. It is of the Curtis type of impulse turbine as developed by the General Electric Company and consists of five stages, the first having two rows of buckets mounted on a single wheel and each of the succeeding stages a single row of buckets. The speed of the turbine is controlled by means of a lever-operated, balance throttle valve in the main steam line, but in order to overcome the loss in efficiency due to throttling when running at reduced speed, two hand valves are provided, which block off a number of the first stage nozzle sections. By this means it is possible to obtain 58, 75, 83 and 100 per cent of full power with full steam pressure at the nozzles, resulting in a net saving of three to five per cent in fuel when it is necessary to run the ship at reduced speed in a rough sea.

The astern turbine has two stages of similar construction, but of smaller diameter, and is mounted on the same shaft and in the same casing as the ahead turbine, both having a common exhaust. Steam is admitted by a balanced valve operated by the same lever controlling the admission valve of the ahead turbine. When the ship is running forward the wheels of the astern turbine revolve in a vacuum and therefore consume but little power.

The reversing turbine will develop two-thirds torque at two-thirds speed with a total steam flow equal to that of the forward turbine at rated capacity. The nozzle area, however, is greater than



View in engine room of the freighter "Thordis," showing General Electric Curtis turbine and reduction gear.

The "Thordis" laying at the wharf of her builders, the Moore and Scott Iron Works of Oakland, California. This is one of the latest of the many craft building on the Pacific Coast to be fitted with Curtis geared turbines furnished by the General Electric Company.

that of the ahead turbine, thus permitting the reversing power to be considerably increased if desired.

The speed of the propeller being 90 r.p.m. and the turbine 3380, it is necessary to obtain a gear reduction of 37.5. This is accomplished by means of a double reduction, the high speed gearing have a ratio of 7.36 and the low speed 5.10.

The reduction gear is of the "one-plane" type; that is, the axes of the high and low-speed pinion and gear shafts lie in the same horizontal plane. This arrangement reduces the head room, simplifies lubrication and facilitates inspection and accessibility to all parts.

Power is transmitted through the high speed or driving pinion to two gears, one on each side, and thence through the two low-speed pinions to the low-speed gear. Rigid bearings are used throughout for the gears and pinions. The division of power between two low-speed pinions possesses several obvious advantages, such as saving in longitudinal space required, weight of parts, width of gear teeth and size of bearings.

The turbine shaft is connected to the high-speed pinion shaft by means of a slip coupling, which prevents any part of the propeller thrust being transmitted to the turbine. The high-speed gears and pinion and the low-speed pinions are, therefore, free to adjust themselves to the position of the low-speed gear, which is coupled solidly to the thrust shaft. The position of the turbine wheels with respect to their nozzles is fixed by a small, adjustable thrust bearing on the turbine shaft.

It is highly desirable on the score of simplicity to be able to use the same grade of oil for both the turbine bearings and the reduction gear, thus preventing duplication of oil pumps, strainers, coolers, storage tanks, settling tanks, etc., It has been possible to accomplish this by the use of a moderate tooth angle and by reason of the flexible disk construction of the gears. Several grades of oil were tried out on the S. S. "Davanger," the best results being obtained with a medium heavy oil having a viscosity of 260 (Saybolt) at 100 deg. F. This oil proved to be about right for the dual purpose for which it was used, being light enough to flow freely through the turbine bearings and heavy enough to give sufficient cushioning effect at the face of the gear teeth. The smooth and quiet running of the "Davanger" gears was remarked upon repeatedly by engineers and others present during the trial trip.

Oil for the turbine bearings and gears is circulated by means of steam-driven pumps, which take the oil from the main tank and force it first through a strainer and then through a cooler before it passes through the spray nozzles supplying oil to the gears, or is delivered to the turbine bearings and the various bearings of the gears and pinions. A settling tank is also provided for removing any water which may get into the oiling system.

The engine room logs of the Union Oil Company's tank steamers "La Brea" and "Los Angeles" afford an unusual and valuable comparison in fuel consumption between reciprocating engines and Curtis turbines with reduction gears. These are sister ships, both built by the Union Iron Works Company in 1916, and both operating in the same character of service and under similar conditions. The ships differ from each other only in character of the propelling machinery and the cargo pumping systems. The "Los Angeles" is driven by a triple expansion engine with a propeller speed of 65 r.p.m. and has the usual type of centralized steam-pumping plant for discharging her cargo of oil. The propelling machinery of the "La Brea" consists of a 2600-b.h.p. Curtis turbine with Alquist reduction gears giving 90 revolutions at the propeller. She is also fitted with a unique and highly efficient cargo-pumping system originated by Mr. O. B. Kibele, Superintendent of Transportation of the Union Oil Company, in which a separate electric motor-driven pump is provided for each compartment. Power being supplied to the motors from a 300-kw. 60-cycle alternating-current Curtis turbo-generator located in the engine room.

Some of the important dimensions and data applying to the hull and propelling machinery of the "La Brea" are as follows:

Length overall, 442 feet; length between perpendiculars, 435 feet; breadth extreme, 56 feet; depth moulded, 33 feet 6 inches; deadweight carrying capacity, 10,335 tons on a mean draft of 27 feet; oil tank capacity, 70,000 bbls.; speed with 10,000 tons deadweight, 11 knots. The propeller is 16 feet 6 inches diameter, 14 feet pitch and runs at 90 revolutions. The turbine rating is 2600-h.p. There are three Scotch boilers with 2685 square feet heating surface. The working pressure is 210 pounds. Fifty degrees F. superheat is used. The condenser cooling surface is 4000 square feet and the circulating pumps have 4000 gallons per minute capacity.

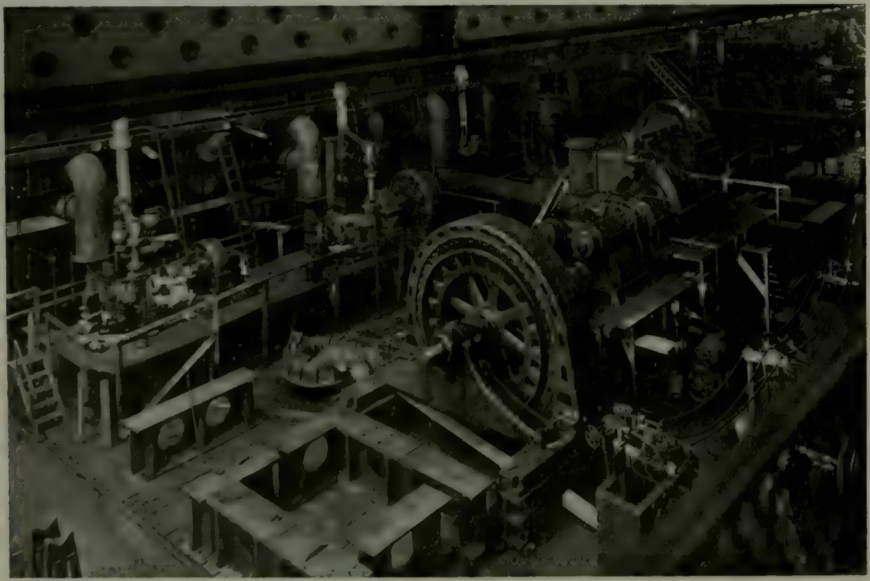
The data given in tables 1 and 11 show the fuel consumption of the "Los Angeles" and the "La Brea" for nine typical voyages each.

It will be seen from the results shown that the increase in fuel consumption of the reciprocating engined ship "Los Angeles" over that of the steam turbined ship "La Brea" under operating conditions as found is: While steaming, 17.9 per cent; while steaming and in port, 21.1 per cent.

The above comparison does not take into account the fact that the average speed of the "La Brea" is one-half knot better than that of the "Los Angeles." If the speeds had been equal in each case, the advantage in favor of the "La Brea" would have been not less than 20 per cent while steaming and 23 per cent while steaming and in port.

When we consider that the engine of the "Los Angeles" was specially designed for high economy, the performance of the "La Brea" is seen to be such as to definitely establish the superiority of the geared turbine drive. With further improvements in the way of increased steam pressures, higher superheats and power-plant design and equipment, there are still further possibilities in reduced operating costs of steamships driven by steam turbines which may be confidently expected in the future.

Colonel Anderson, C. M. G., Chief Engineer of the Canadian Marine Department, has been making a thorough investigation of port conditions at Victoria, Vancouver, Prince Rupert, Port Hardy, etc. Colonel Anderson has headed the engineering division of the Canadian Marine Department for thirty-six years.



A 2,400-horsepower, 3,500-90 r.p.m. geared marine turbine on the test stand at the Schnectady works of the General Electric Company.

Some March Shipbuilding

Launch of the "Benjamin Brewster" at the Harlan and Hollingsworth Corporation's shipyard, Wilmington, Delaware.

THE Sloan Shipyards Corporation has purchased the Capital City Iron Works at Olympia. This branch of the business will be under the charge of Mr. H. H. Piper from Chicago.

The steam schooner "Flavel" was launched at the Bendixen yard on March 3. The vessel is built to the order of the Hammond Lumber Company and is of 1,000,000 feet lumber capacity, being 220 feet long, 42 feet beam and 14 feet depth.

The Ames Shipbuilding and Dry Dock Company of Seattle has secured an order for seven 9,000-ton freighters for the Cunard Line. A contract has also been secured for the building of a 9,400-ton d. w. freighter for W. C. Peagle of Cleveland, Ohio.

The McEachern Ship Company of Astoria launched the auxiliary schooner "Margaret" on March 3. The "Margaret" is 250 feet long by 42 feet beam by 21 feet moulded depth. She will be fitted with twin 240 b.h.p. Skandia engines built by the Skandia Pacific Oil Engine Company of San Francisco. A 75 h.p. Fairbanks-Morse oil engine supplies power for pumps, wireless, deck machinery, etc.

The Wallace Shipyards Limited of North Vancouver, British Columbia, launched the auxiliary motorship "Geraldine Wolvin" on March 6. The "Geraldine Wolvin" is 236 feet long, 45 feet beam and 20 feet 10 inches moulded depth. She will be equipped with twin 160 b.h.p. Bolinder engines.

The Lanteri shipyard of Pittsburg, California, launched a ferryboat on March 6, built to the order of the Martinez-Benicia Ferry and Transportation Company. The moulded dimensions are: Length 165 feet, beam 34 feet, depth 14 feet. Horizontal-compound engines are to be installed by C. H. Evans and Company of San Francisco.

The Skinner and Eddy Corporation launched the tanker "S. V. Harkness" on March 22nd. The "Harkness" is being constructed to the order of the Standard Oil Company of New Jersey and is of 65,000 barrels capacity, being 435 feet long over all, 420 feet between perpendiculars, 57 feet beam and 31 feet 6 inches depth. She will be driven by Curtis geared turbines supplied by the General Electric Company.

The Puget Sound Bridge and Dredging Company's March launching was an auxiliary wooden schooner 250 feet long by 43 feet beam by 21 feet moulded depth, to be powered with twin 240 horse-power semi-Diesel engines.

The month of March saw a large number of cannery tenders launched at Seattle, among them being an 80-foot tender for Libby, McNeil and Libby, launched from the John Wilson yard; a 78-foot tender for the Apex Fisheries Company, launched from the Elliott Bay Yacht and Engine Company's plant, and a 64-foot tender from the Ballard Marine Railroad's shipways.

The McAteer Shipbuilding Company is making rapid progress on the large floating dry dock they are building for the Seattle Construction and Dry Dock Company. The four sections are each 129 feet long and 90 feet wide and will have a combined lifting capacity of 13,000 tons. Additional sections may be added, making a 20,000-ton dock.

THE "BENJAMIN BREWSTER"

The steamship "Benjamin Brewster" was launched at the yards of the Harlan and Hollingsworth Corporation, Wilmington, Delaware, on Tuesday, February 20. She was built to the order of the Standard Oil Company of New Jersey to carry petroleum in bulk and is the first of four large tankers building at the Wilmington yard for this corporation.

The vessel is 430 feet long over all, 412 feet between perpendiculars, 52 feet 1 inch moulded beam and 31 feet depth to the upper deck and has a long poop and short bridge and forecastle, the officers' accommodations being in houses on top of bridge and on poop, petty officers and crew being housed in the poop and forecastle.

The "Benjamin Brewster" is subdivided for carrying oil in bulk, having eighteen transverse bulkheads and one longitudinal bulkhead. She has 18 main oil tanks and ten Summer tanks. The pump room is amidships and a cofferdam it fitted at either end of the oil cargo space; also an intermediate cofferdam, with an additional cofferdam between the boiler room and the fuel oil bunker;

four cofferdams in all. Under the forward dry cargo hold, a deep tank is fitted for ballast or fuel oil, if same is being used. The cross oil bunkers are all oil-tight riveted in case they are to be used for fuel oil. Double bottoms are fitted under engine and boiler rooms. The "Brewster" is built on the Isherwood longitudinal system.

This vessel will carry 8,130 tons deadweight on an extreme draft of 24 feet 8 inches, the gross measurement tonnage being 5,605 and the net 3,420 tons. She is propelled by triple expansion engines, having cylinders 27, 45 and 74 inches in diameter by 48 inches stroke. Steam, at a working pressure of 180 pounds, is supplied by three marine type Scotch boilers 15 feet 6 inches in diameter and 11 feet 7 inches long and having a total heating surface of 8,300 square feet. The boilers are arranged for burning coal or oil as fuel under the Howden system of hot air forced draft.

The two cargo oil pumps are 15 inches by 11 inches by 18 inches stroke horizontal duplex, of the National Transit Company's make. The ship is fitted with all necessary piping for the handling of oil or gasoline cargo, together with heating piping, gas piping, vapor piping, etc. She is fitted with electric lighting plant, wireless apparatus, fire fighting equipment and also has a full complement of lifeboats on each side of the ship.

A great deal of care has been taken in looking out for the comfort of officers and crew, all living quarters being very commodious.

On March 14, the Seattle Construction and Dry Dock Company launched the 7,500-ton freighter "Golden Gate," built to the order of Knute Knutsen of Haugesund, Norway. The "Golden Gate" is 396 feet long, 53 feet beam and 29 feet 3 inches deep and will be driven by a triple expansion engine of 2500-h.p., having cylinders 24, 40 and 70 inches in diameter by 48 inches stroke. Steam will be furnished by three Scotch marine boilers. A sister ship of the "Golden Gate," to be christened the "Key West," will be launched from the same yard on April 11 and a third vessel some time in May.

The steam schooner "Horace X. Baxter," built to the order of the J. H. Baxter Company, was launched at the North Bend shipyard of Kruse and Banks on March 10. The "Baxter" is 225 feet long, 42 feet beam and 16 feet 6 inches moulded depth, and will be fitted with an 800-h.p. triple-expansion engine at San Francisco by the Main Street Iron Works.

John Coughlan and Sons, of Vancouver, a firm that has handled many important structural steel contracts in the Northwest, has entered the shipbuilding field and have secured orders for three 8,800-ton deadweight cargo boats from Norwegian interests and three similar craft from Great Britain.

L. H. Gray & Company and R. F. Guerin of Seattle are reported as securing options on some Salmon Bay, Seattle, water front with the intention of establishing a wooden shipyard.

The New York Shipbuilding Corporation of Camden, New Jersey, has announced the construction of four standard freighters on their own account. Two of these craft will be of 5,500 tons deadweight and two of 4,000 tons deadweight. Two oil-burning passenger and freight steamers have also been undertaken for W. R. Grace and Company, to be 5,000 tons gross and have accommodations for 100 passengers. Two 10,000-ton freighters will also be built for the International Mercantile Marine and these vessels will be of 10,000 tons deadweight capacity, and it is understood will be used by the Atlantic Transport Company.

The "Robert Sudden," a sister ship to the "Ryder Hanify," was successfully launched at Stone's yard, East Oakland, Cal., on March 17. The "Ryder Hanify" was designed by W. F. Stone and is 235 feet over all, 43 feet beam and 17 feet depth of hold. She is designed to carry 1,500,000 feet of lumber and will be driven by a 1,000-h.p. triple expansion engine built by the Main Street Iron Works, steam being furnished by two B. & W. boilers. The vessel is being rigged with three masts and three sets of powerful gear for working her three hatches. An unusual feature of the "Robert Sudden" is the placing of her boilers on the main deck, thus allowing considerably more cargo space in her hold and making the vessel more practical for general freighting if her owners ever desire to use her for anything but lumber carrying.

NEW YORK SHIPBUILDING CORPORATION

The Marine Press has published, from time to time, articles describing the plant of the above firm, and it must be quite familiar to readers of this journal in its essential features.

Shortly before the beginning of the year 1917, the New York Shipbuilding Company was dissolved and a new corporation formed under the direction of the American International Corporation, The International Mercantile Marine Company, W. R. Grace and Company, and the Pacific Mail Steamship Company. Plans for the extension of the plant are under discussion and four new ship ways are about to be laid down; these, together with the existing ways, will give a capacity for laying down fourteen moderate sized vessels at once, or seven of the largest types at present contemplated for either naval or mercantile service; compared with the original layout of seven moderate dimension ship ways, it is seen that the capacity completed and contemplated doubles the original plant, now some eighteen years old.

The yard is at present engaged on the con-

The "Mielero," one of the latest products of the Fore River Shipbuilding Corporation.

struction of some twenty-four vessels, which includes three battleships, two passenger and cargo ships, three freighters, eight tankers, seven colliers, and one small mine planter.

Besides the increased number of ship ways, the machine-shop, wharves and auxiliary building have been increased to preserve a proper balance.

As is well known, this yard is served by an elaborate system of overhead cranes, running down the ways and suitably arranged with connecting units working along the shops.

THE "MIELERO"

An indication of the feverish demand for freight steamers is found in the fact that although the large steel tanker "Mielero" built by the Fore River Shipbuilding Corporation for the Cuba Distilling Company of New York was launched less than a month before, she left the Fore River yards on February 17, to go immediately into commission.

The "Mielero," the third of a fleet of these tankers built by the Fore River Shipbuilding Corporation for the Cuba Distilling Company, is designed to carry molasses in bulk north and petroleum in bulk south, without renovating her tanks. She has a carrying capacity of about 1,500,000 gallons of molasses and about 2,250,000 gallons of oil, the cargo deadweight being a little over 8,000 tons. Her length between perpendiculars is 389 feet and she is propelled by a vertical triple expansion engine.

BRITISH COLUMBIAN SHIPBUILDING

The following article is reprinted from the "Marine Engineering of Canada" and is a well-deserved tribute to the energy with which that province has entered the shipbuilding field:

The shipping industry of British Columbia is really just emerging from its infancy, and is only now on the threshold of what bids fair to be an era of great prosperity. The reasons for this are not difficult to find, being chiefly due to the newness of the country and the undevelopment of its re-

The steamer "Panuco," built by the Seattle Construction and Dry Dock Company.

Birdseye view of the plant of the New York Shipbuilding Corporation, showing the three covered ways and the covered fitting out berth. New building ways will be put in along the waterfront to the right of the picture.

sources, which, although almost unlimited, have so far hardly been touched; as a consequence, while there has always been a strong demand for import tonnage, no return cargoes have been available. Our Pacific Coast cities have not been able to offer inducements to shipowners that were worth considering when compared with those offered by those more fully developed on the adjacent coast of Washington. Although a thriving trans-Pacific trade has been done for many years, we in this British Columbia have only recently begun to seriously take a hand in it.

An earnest effort is now being made to put the cities of this province definitely on the map as shipping centres; Vancouver is by far the largest of these, with Victoria second. There are now represented in Vancouver three companies engaged in trans-Pacific trade—the Canadian Pacific Steamship Lines, the Dollar Co. and the Canadian Australasian Royal Mail Line. In addition, there are several companies engaged in the coasting trade, the latter fast assuming considerable proportions. Chief among them are the C. P. R., the G. T. P., the Union Steamship Co., and the Terminal Navigation Company.

Wallace Shipyards

A few months ago an order was placed with the Wallace Shipyards of North Vancouver for three large, five-masted schooners by the Canada West Coast Navigation Co., the intention being to place them in the lumber-carrying trade. The principal dimensions of these vessels are as follows: Length over all, 250 feet; length on l.w.l., about 235 feet; beam outside of planking, 44 feet; maximum draft, 16 feet; total displacement, 3,500 tons; tonnage for cargo, 2,500; cost equipped, $250,000. The auxiliary propelling machinery will consist of two Bolinder semi-Diesel engines of 160 b.h.p. each. The Wallace Shipyards have also, with a commendable spirit of enterprise, undertaken the building of a fouth schooner of the above dimensions, with the intention of either operating or selling her, as opportunity may offer. This company has also an order of two steel twin-screw cargo vessels of 4,200 tons displacement, one for British interests, and one for Mitsui and Co., of Japan. Their chief dimensions are: Extreme length over all, 315 feet; length between perpendiculars, 300 feet; beam, 45 feet; maximum draft, 18 feet 6 inches; depth of hold, 27 feet; i.h.p. of engines, 1,500; tonnage for cargo, 4,500, including coal carried in bunkers. The Wallace Shipyards are also well equipped for handling ship repairs, having two marine railways, one of them being capable of docking vessels up to 2,500 tons displacement. The other and smaller one is intended chiefly for vessels such as tugs and scows; it is nevertheless capable of docking vessels up to 1,000 tons displacement.

Situated in the city of Vancouver itself there are two other concerns engaged in the business of shipbuilding and ship-repair—the B. C. Marine, Ltd., and the Vancouver Shipyard. The first named has accommodations for docking vessels up to 2,000 tons displacement. It is quite a promising little plant, well equipped for all ordinary ship repairs, and being close to the new Government grain elevator and dock, is very favorably situated. While this company in past years has built quite a number of fairly large vessels, they have not so far taken the share in the present revival of the shipbuilding industry to which they seem to be entitled, but have confined themselves strictly to repair work.

The Vancouver Shipyard has a well equipped little plant for small craft, and has a marine railway which is capable of hauling out vessels up to about 600 tons deadweight.

Vancouver Dry Docks, Ltd.

Arrangements have been made by Charles Meek for the erection of a plant which marks the beginning of a new era as regards Vancouver shipping. It will operate under the name of the Vancouver Dry Docks, Ltd., and is calculated to fill a long-felt want, all large vessels hitherto having been forced to go elsewhere when actual dry-docking was required, many hundreds of thousands of dollars thus being lost to Vancouver annually. The present intention is to build one double section floating drydock which will be capable of handling vessels up to 18,000 tons displacement, this being sufficient to accommodate the largest vessels on this coast at present with ease. It is confidently expected that this dock will be in actual operation within the next twelve months. It is also their intention to operate an extensive shipbuilding plant.

The White Pass & Yukon Railway Co. has also completed arrangements for the building in Vancouver of two small passenger vessels, one for service between Cariboo and Taku, and one on Atlin Lake. That for the river service will be a typical stern-wheel craft, 165 feet long by 35 feet, however, with accommodation for eighty passengers. The other will be a twin-screw craft propelled by internal-combustion engines of 90 feet in length by 18 feet beam, and with accommodation for 100 passengers. She is intended for daylight service only. These two vessels will be shipped north in sections, and assembled there.

Genoa Shipbuilding Company

An order was recently placed with the Genoa Shipbuilding Co., of Victoria, for three wooden schooners, similar in all respects to those now building in Vancouver. Two of these are now nearing completion, and should be able to go to sea early in the coming year. The only two companies in Victoria who combine shipbuilding with repairs are the Victoria Machinery Depot, and Yarrows Ltd., the latter firm having just completed a light-draft steel vessel for the Indian government. They are now erecting the framework of a second one. Both these firms are equipped with marine railways capable of docking vessels of 3,000 tons displacement.

The shipping of Victoria harbor is chiefly composed of small coasting vessels engaged in log towing for the numerous saw mills. It is also the headquarters for the Pacific Whaling Co., who operate quite a numerous fleet. Victoria is also a port of call for almost all the larger vessels which berth at Vancouver.

A great amount of work has been done by the Dominion Government to improve the docking and berthing facilities of Victoria, an extensive system of piers being now under construction at the mouth of the harbor. These are sheltered by a magnificent breakwater which is now almost completed. The work was rendered necessary owing to the depth of water in the harbor proper being only sufficient for vessels of about 18 feet draft at all stages of the tide. The minimum depth of water alongside the piers under the shelter of the breakwater is now 35 feet, which is sufficient for the largest vessels at present plying to the Pacific Coast.

The picture herewith is of the latest addition to the floating dry dock equipment of the Union Iron Works Company. The dock is 450 feet long with 25-foot working platforms at either end on the overhang. It is 100 feet extreme beam and 80 feet between wings, 12 feet 9 inches depth from deck to floor and 42 feet from floor to top of wings. There are eleven watertight bulkheads, dividing the craft into twelve watertight compartments. The flooding valves are 12 by 24 inches in size and 22 in number. Vertical, electric pumps are used for unwatering. The capacity of the dock is about 8,000 tons.

DEATH OF CAPTAIN HAYS

Captain James M. Hays, one of the best loved among the San Francisco bar pilots and known from one end of the Pacific Coast to the other, met his death in the early morning of March 10. Captain Hays was on board the pilot schooner "Adventuress" with several other pilots and left in a yawl to board the steamer "Santa Rita." The boat was overturned in a wave and Captain Hays and the two sailors who were rowing were thrown into the icy water. It is thought that the shock affected the captain's heart, for while he floated, when rescued and brought aboard the pilot boat he could not be resuscitated.

Captain Hays was 57 years old and has been known on the coast for nearly half a century, coming to San Francisco as a boy on board the American ship "Joseph B. Thomas," one of the New England-built clippers.

The latest addition to the Union Iron Works dry dock equipment, a large floating dock just completed.

Our Early Shipbuilders --- The Russians

By J. Wyllie

DURING the first half of the nineteenth century most of the shipbuilding on the Pacific Coast was done by the Russians, whose need of bottoms was indeed pressing. As they followed the seal herd and the sea otter to the eastward, the fog-hidden, rock-bound shores of the Aleutians took such heavy toll of their ill-built craft that the history of the Russian fur trade is an unparalleled record of marine disaster and suffering.

Being unable to procure a sufficient number of vessels from the Baltic ports, the Russians began to build them at Okhotsk, but as the ships bringing material from the westward were often lost or delayed, many of these Siberian craft were only open or half-decked boats, the planks being lashed to the frames with rawhide thongs for the want of metal fastenings. Though many vessels were lost, the returns from a successful cruise after the finest furs the world had ever seen proved a never-failing incentive for adventurous spirits to fit out and man other expeditions. Some of these, through costly presents of furs and tales of wealth to be found overseas, secured the backing, or at least the favor, of the Empress (Catherine) herself.

Among the numerous companies formed to exploit the resources of the new land, the most important was that of which Grigor Ivan Shelikof, founder of the Russian colonies in America, was the head. Shelikof, through his fortunate selection of an agent, was soon able to out-distance all competitors. In Alexandre Baranof he found a man of indomnitable perseverance and iron will, who cast off home ties and devoted his life with all its untiring energy to the interests of his employers and the furtherance of Russian dominion beyond the sea. In 1790, Baranof was sent from his Siberian post to assume the management of the company's affairs in Alaska, with headquarters at the Bay of Three Saints on Kadiak island. He arrived at his new post in the following year and immediately set about the removal of the post to Pavlovsk Harbor (St. Paul), on the north side of the island, where a permanent colony, which contemplated the tilling of the soil and raising of birds, was to be established.

Ships in which to convey the furs to Asia and transport the no less valuable supplies for the colonists being an imperative necessity, Shelikof wished to establish a shipyard in the colony and to that end sent a shipbuilder to Baranof's assistance. This was an Englishman named Shields, who had learned the trade in his own country, but who had joined the Russian service and risen to the rank of sub-lieutenant. Shields' first Russian vessel was the "Orel" (Eagle), which he built for Shelikof at Okhotsk, and, being a navigator as well as a builder, he was placed in command and sailed her to Kadiak.

Baranof, who in his cruises along the coast with his natives had been on the lookout for a suitable location for a shipyard, decided on a spot on the western shore of Prince William Sound, near the present terminal of the Alaskan railroad on Resurrection Bay, and here the work of construction was begun. Surely never was shipbuilding carried on under greater difficulties. Nearly all of the timbers and planking had to be hewn out of the whole log for want of proper saws, while the ironwork was so badly rust-eaten in the damp climate that, as most of it had been collected from wrecks in all parts of the colonies, it was necessary to re-forge it before it could be used. Baranof even tried, but without success, to smelt iron from flotsam which his men had picked up. Shelikof had sent orders for Shields to return after consulting with Baranof, but the latter would not allow him to depart and wrote to his superior that he could not afford to send away his most valuable assistant. However, when the vessel was far enough advanced to render Shields' constant supervision unnecessary, Baranof, who had no liking for the foreigner, under promise of reward, sent him and his four English sailors off on a cruise in the "Orel" in search of some islands, of the existence of which he himself had no belief.

As the hull neared completion in spite of all the drawbacks which had attended its construction, another series of obstacles confronted her builders. The rope and sailcloth, like the ironwork, were already worn out from other uses; the canvas had been used to cover stores and for sails and was nearly rotten, and the rope had to be re-spun. In his report to Shelikof, Baranof wrote, "We have only half a keg of tar, three kegs of pitch, not a pound of oakum, not a single nail and very little iron for such a large vessel. What little canvas you sent us we have been compelled to use for bidar sails and tents, for those we had were entirely worn out from long usage." As most of the men who had assisted Shields had only seen the crude vessels of Siberian traders, no doubt the work suffered through the somewhat spiteful action of the manager in removing his only competent builders and riggers.

Enough junk was scraped up with which to caulk the greater part of the hull, but above the water

The Russian warehouse at the head of the wharf at Sitka was built of huge logs, the bottom rounds being over three feet in diameter.

line the seams were caulked with moss. There was at least plenty of that material close at hand. A mixture of tar and whale oil was used for paint, but as this was boiled in small quantities it was of as many shades and as the sails were a mass of patches and colors made from old sails and tarpaulins which had already done service in most capacities to which canvas could be put in most of the colonies from Kamchatka to Kadiak, the whole presented a mottled appearance beyond the power of words to describe. The vessel, which was built entirely of native spruce, was ship rigged. She was 79 feet long on deck, 23 feet beam and 13 feet 6 inches in depth, and, but for her upper works, proved a credit to the skill of the builder and to the ingenuity of the manager in devising expedients to further the work. She was launched in August, 1794, being christened the "Phoenix," and on September 4 was dispatched upon her first voyage to Kadiak. On the way, the flimsy rigging snapped before the first breeze and the vessel entered Pavlovsk harbor not with swelling sails but towed by boats. "Nevertheless joy reigned in the settlement and the event was celebrated with solemn mass and merry feasting."

In the meantime, Shields had returned from his profitless cruise and was set to work refitting and rigging the vessel and under his command, on April 20, 1795, she sailed for Okhotsk. The passage was made in the record time of one month, and ship, builder and crew were greeted with salvos of artillery, ringing of bells and celebration of mass. As the vessel had neither cabins nor deck houses, workmen were immediately sent on board to give her a general overhauling and put on the finishing touches. The "Phoenix" continued to make regular trips until the spring of 1800, when she was lost with all hands in the Gulf of Alaska.

Baranof, who had returned from Sitka Sound on a visit to his posts at the westward, writing in the middle of July about ill-going affairs at Kenai, said: "But the saddest news of all and the most disastrous to us, is the wreck of the "Feniks" with the loss of the whole cargo and all on board. For two months portions of the wreck have been cast on the beach in various

Baranof Castle, the Russian Governor's headquarters, was built of square timbers and fastened throughout with copper rods bolted to the rock foundations, the first castle having been overthrown by an earthquake. The building was erected in 1827 and burned to the ground in 1894. In the cupola on the roof a lamp was kept burning, the first lighthouse on the Coast.

localities, but the exact place of the disaster remains unknown."

With the launch of this ship, the yard at Voskressinski (Resurrection) Bay seems to have been abandoned, as two more vessels launched in 1795, the "Dolphin" and the "Olga" of 40 and 50 feet in length, respectively, were built at Spruce Island, near Kadiak.

Fur becoming scarce in the vicinity of Kadiak, in April, 1799, Baranof set out with an expedition, consisting of several small sailing vessels and about 350 canoes, to establish a post to the eastward. About six weeks later he arrived at Norfolk, or Sitka, Sound, and finding there a suitable location immediately set about the construction of the necessary buildings. The following summer, having, as he thought, got the settlement safely started, the manager returned to Kadiak and other western posts, leaving affairs at Sitka Sound in the hands of an assistant. His confidence proved to be ill-founded, however, for in June, 1802, the natives, with whom there had been more or less trouble, rose and massacred the small garrison and took possession of the post.

In the meanwhile, Shelikof, whose ambitions were still hampered by rival traders, secured a new charter from the Emperor Paul, who issued a ukase granting the company special privileges, which practically amounted to a monopoly. The new concern was named the Russian-American Company. Baranof, who had learned of the fate of his new colony, upon being advised of his company's preferment, determined to avenge the massacre of his settlers and re-establish the colony. In April, 1804, he again set his face to the east, calling at the port of Yakutat, where he had left orders for the construction of two schooners, which he found ready waiting for him. These schooners, the "Yermak" and the "Rostislaf," were built during 1803-1804.

With these craft added to his fleet of four sailing vessels, manned by 120 Russians, and 300 bidarkas with about 800 Aleuts, he arrived at his destination on September 19 and set about the recapture of the post. Baranof's valiant efforts, however, might have proved unavailing but for the arrival of the government ship "Neva," then on the first Russian voyage of circumnavigation. Captain Lisianski, who had been visiting the settlement at Kadiak, on learning of the manager's intentions, proceeded to his assistance and between the attacks of Baranof's forces and the ship's guns the natives were put to rout after nearly a week of fighting.

The post was re-built and the new settlemen, which was to become permanent, was named Novo Arkhangelsk (Sitka). Among other activities, ships had to be built and repaired and by 1806 a set of ways had been laid. The first vessel to be built at the new yard was the brig "Sitka," which was launched in 1807. This vessel was built under the superintendence of an American named Lincoln, who received a bonus of 1,000 roubles for each ship launched. The ship "Okrietie" was launched on July 16, 1808, and the keel of the schooner "Chirikof" laid in the same year. Although there is a record of her service, no mention is made of the launching.

Despite the fact that he knew that the Spaniards, Britons and Americans had explored and laid claim to the lower coast, Baranof, like some giant chess player moving his men in thousand-mile jumps along the shore line of a continent, in 1808 sent out an expedition to New Albion with orders to locate a desirable place upon which to found another colony.

This expedition, meeting with reverses, had to return. In 1810 another expedition was started out and in 1812 a site was chosen about twenty miles north of Bodega Bay. The new colony was named Ross, from the root word of the name Russia. In line with the company's policy that each of the colonies should furnish its own share of bottoms, a shipyard was soon in operation at Ross. From 1816 to 1824, four vessels were built, but the native oak that was used for frames proved unsuitable and the vessels soon rotted, only one of them lasting six years. These vessels were the schooner "Rumiantzof" of 160 tons, launched in 1818 and useless by 1823; the brig "Buldakof", of 200 tons, launched in 1820 and out of commission by 1826; the "Volga" of 160 tons, launched in 1822 and unseaworthy in 1827; and the Kiakhta," of 200 tons, launched in 1824 and still in service in 1830. Besides these, several small vessels for the Spanish missions were built at Ross. The new colony, proving a failure in every respect, was abandoned and in 1834, Baron Wrangell, who was now chief manager and Governor of the territory, ordered all the shipyards in the colonies to be dismantled excepting the one at Sitka. Besides the vessels already noted, there were built at that yard the schooners "Patof" and "Baranof," 1817-1819, by 1827 half a dozen tenders had been constructed and in 1829 the "Ourup," a fine ship of 300 tons, was launched.

The Russian method of keeping down foreign competition differed somewhat from that adopted by the Spaniards at Nootka. During Baranof's administration several vessels with their entire cargoes had been purchased from American traders and, it having been found that ships could be bought cheaper than they could be built and better ones at that, the services of the shipyard were confined largely to repair work, for which there was an ever-increasing demand. Work at the Sitka yard was now carried on under the supervision of a native Alaskan, the Creole Netzvetoff, a native of Kadiak Island, who had been sent to St. Petersburg to learn the trade.

The last sailing vessel built at Sitka, of which there is mention, was the brig "Promissel," launched in 1839, about which time the Russians turned their attention to steam. Between 1839 and 1842, the steamer "Nikolai 1," of 60 horse-power, and the steam tug "Muir" had been constructed. The machinery for the larger vessel had been imported from Boston, but everything for the tug was made in the Sitka shops under the superintendence of machinist Muir, after whom the vessel was named.

From this it would appear that the Russians, besides having built the first square-rigger, are also entitled to the credit for the first steamer and, as a beacon light had been placed in the cupola on top of the new Baranof Castle in 1827, probably for the first lighthouse on the Pacific Coast as well. About the middle of the forties, a first-class plant had been installed. In the Nautical Magazine for June, 1849, a Mr. A. J. Findlay, writing about a visit to Sitka, said: "The arsenal is the next object which attracts the attention of a stranger, from the number of men employed either building new or repairing old vessels. At this moment they are building a new steamer, destined, I think, for Mr. Leidesdorf of California. The workmanship appears good and solid; everything for her is made on the spot, for which purpose they have casting-houses, boiler-makers, coopers, turners and all the other 'ers requisite for such an undertaking. The boiler is almost completed and is made of copper. They have also their toolmakers, workers in tin and brass, chart engravers, sawyers and sawmills, for all of which occupations suitable establishments have been made."

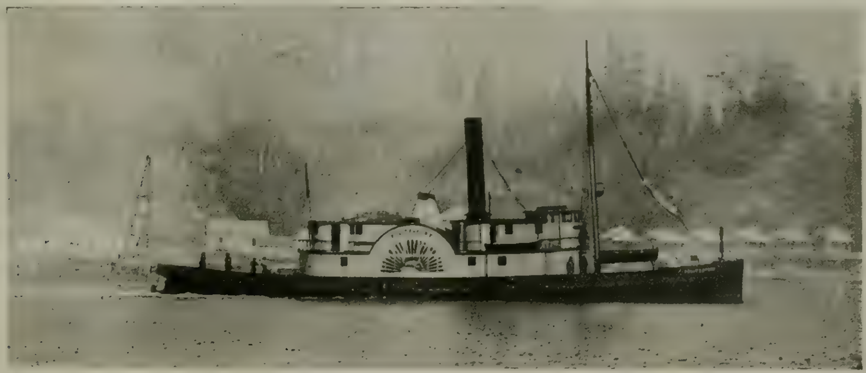
Although she has already been the subject of more copy than most vessels on the Pacific, any article on the early shipping of the Northwest would be incomplete without mention of one of the last vessels, if not the last, built by the Russians. The "Politkofsky," a side-wheel paddle steamer, was built at Sitka in 1863. She was a vessel of 175 net tonnage, 130 feet in length and 352 horsepower. Her crowning feature was her copper boiler, which in all probability was made at Sitka.

In 1867, Prince Matsukof, the chief administrator, in winding up the company's affairs, sold the vessel to Hutchinson, Hvisch & Company of Sitka for $4,000. In the following year, the new owners sold her to Hutchinson, Kohl & Company at an advance of $6,000. Captain Kohl took her to San Francisco via Victoria, where the "Colonist" of April 22, 1868, after a number of uncomplimentary remarks anent her appearance, said: "Her engines are good and were formerly in a Russian fur company's steamer. Her boiler is of copper three-quarters of an inch thick and alone is worth the price Captain Kohl paid for the whole concern."

On arrival at San Francisco, the boiler was sold at a figure which justified the "Colonist's" valuation, and with one of a more common type installed, and after a thorough overhauling, the vessel was again taken north, where she was shortly afterwards transferred to the Blakely Mill Company.

The "Pollytoufsky," as the name was usually pronounced, was a never-failing source of interest as she lay at her berth at the foot of Washington street in Seattle. The foreign name and ever-recurring mention of the copper boiler did the trick. Feature writers pictured her in the Sunday papers as a Russian man-o-war and the fact that she had originally carried some armament, as was the custom when she was built, lent color to their yarns. The "Polly's" life-long service, however, had been spent in more useful, if less pretentious duties.

After many years of service towing rafts of logs to the Blakely mills, in 1897 she was sent to St. Michael, where she was used for a lighter. In 1902 she was driven ashore during a storm and abandoned. Ten years later the greater part of the hull was still intact, the staunch cedar timbers stubbornly defying the elements.



The steamer "Politkofsky," built at Sitka in 1863, the last vessel of any consequence built in Alaska. With the passing of the Russians from the territory also passed the shipbuilding industry. Photograph by courtesy of the Port Blakely Mill Company.

With the passing of the Alaskan territory to the American Government, the shipyard at Sitka was dismantled and boat-building in Alaska since that time has been confined to river steamers and fishing boats and these are mostly constructed of imported timber.

PNEUMATIC TOOLS IN SHIPBUILDING

There is no line of construction in which pneumatic tools and compressed air appliances generally have played a greater part than in the building of ships. The ease and convenience of bringing pneumatic tools to the work specially adapt them to ship construction when so many of the processes must be performed in places difficult of access, and when it would not be possible to use heavy machinery.

It was in riveting that pneumatic tools first showed their superiority over hand work not only in actual cost but in the saving of time. The first authentic figures showing in detail how pneumatic riveting outclassed hand riveting were derived from a test covering a period of three weeks at the Chicago Plant of the American Shipbuilding Co. While these figures would be more favorable to pneumatic riveters were the test made now—due to improvements made in the pneumatic riveters themselves—they demonstrate the remarkable advantages and savings possible to obtain by the use of pneumatic tools.

Distribution—	Number of Rivets	Diameter of Rivets	Machine Rate Each	Hand Rate Each
Keel	6,217	1 inch	2½c	4½c
Shell	21,628	⅞ inch	1¾c	3½c
Shell margin (bilge single line)	1,122	⅞ inch	3 c	4½c
Longitudinals open	24,632	¾ inch	1¼c	2¾c
C. V. K. brackets	3,197	¾ inch	1 c	3½c
C. V. K. brackets	....	....	1¼c	3½c
C. V. K. brackets	....	....	1½c	3½c
Longitudinals under tank	644	¾ inch	1¾c	2¾c
Longitudinals bars	2,989	¾ inch	1¼c	2¾c
Tank-top stiffeners	1,129	¾ inch	2½c	3½c
Tank-top margin	4,033	¾ inch	1½c	2¾c
Tang-top lugs	1,520	¾ inch	1¾c	3½c
Tank-top rider	3,209	¾ inch	1¼c	2¾c
Tank-top	4,467	¾ inch	1¼c	2¾c
C. V. K. (cross vertical kelson)	12,723	¾ inch	1 c	3 c
Hold stringer	1,184	¾ inch	1½c	3 c
Floors	123	¾ inch	1¼c	3 c
Floors (odd)	5	¾ inch	2 c	6 c
C. V. K. (odd)	38	¾ inch	2 c	6 c
Bulkheads	1,318	¾ inch	1¼c	5 c
Bulkheads	3,051	¾ inch	1¾c	3¼c
Bulkheads	231	⅝ inch	1½c	2½c
Total	93,480			

Total cost of job by hand would have been....$2,986.87
Total cost of job by machine was.................... 1,403.31

Saving of machine over hand work....................$1,583.56
Average cost per rivet of hand work................ .0319
Average cost per rivet of machine work.......... .0150
Average saving per rivet of machine over hand work .... .0169
Average cost of machine riveting was 47 per cent of hand cost.

Great savings were effected by pneumatic chippers and caulkers, while still greater savings were obtained through the use of pneumatic drills, reamers and wood-borers.

Compressed air is now considered a necessity in ship construction and many uses for compressed air appliances have been found that at first were not dreamed of.

Pneumatic side light cutters, pneumatic scaling hammers, the sand blast, pneumatic hoists are a few of the additional appliances operated by compressed air that have been adopted by shipbuilders and special applications are being found every day. Modern ships of any size are equipped with air compressors and pneumatic tools for repairs of a general or emergency nature, and ships that have been wrecked have been raised and removed from perilous situations by the aid of compressed air.

SHIPPING BOARD ORGANIZATION

The Shipping Board has outlined its plan of organization, the duties of the various divisions being as follows:

Division of Investigation and Legislation:

Investigation and study of mercantile marine affairs and shipping operations of the United States and foreign countries with view to using results as basis of recommendations to Congress of changes in the laws of the United States as follows:

1. Relative cost of building vessels of the United States and foreign countries.

2. Relative cost, advantages and disadvantages, of operating vessels of United States and foreign countries.

3. Rules of building, classification, operation and rating of vessels of United States and foreign countries affecting safety of navigation and rates of marine insurance.

4. Marine insurance of vessels and cargoes of United States, and reinsurance of American marine risks in foreign insurance companies, with view of developing an ample marine insurance system in the United States.

5. Methods of financing of vessel property of United States and foreign countries, with view of encouraging investment in American shipping.

6. Opportunities for development of American commerce through establishment of regular lines of vessel transportation.

7. Collection of general information in regard to mercantile marine affairs and shipping conditions of United States and foreign countries, and editing reports of Board.

Law Division:

All matters pertaining to the law, including interpretation of Shipping Act relative to all subjects under jurisdiction of Board.

Preparation of contracts for purchase, sale, chartering, leasing constructions, and repair of vessel property.

Represent the Board in all questions coming before the Courts.

Division of Regulation of Transportation by Water:

Regulation of transportation by common carriers on the high seas and Great Lakes on regular routes between one state and any other state or foreign country.

Division of Discrimination by Foreign Governments and Individuals Against American Shippers and Vessels:

Investigation which may arise in consideration of matters contained in Sections 26 and 36 of the Shipping Act relative to discrimination by foreign governments and shipowners against American shippers and vessels.

Report to President results of investigations of discriminations by foreign governments against American vessels engaged in foreign trade with object of obtaining relief by diplomatic means or by special Acts of Congress.

Report to Secretary of Treasury results of investigations of discrimination by foreign vessels in American ports against American shippers with view of a refusal of a clearance to such vessel.

Investigations of violations by foreign vessels of sections of Shipping Act relating to regulation of transportation by water.

Division of Vessels and Terminals:

Standardization of plans and specifications of vessels and terminals for the purposes of the Board and the development of American Merchant Marine.

Construction, repair, inspection and rating of vessels and terminals, whether owned by the Board or upon which it has a mortgage or lien or other interest therein.

Division of Shipping Management:

Standardization of methods and forms of accounts of shipping management and operation of vessels and terminals for the purposes of the Board and the development of American Merchant Marine.

Chartering, leasing, outfitting, manning, examination, marine insurance, financing, and shipping management of vessels and terminals, whether owned by the Board, or upon which it has a mortgage or lien, or other interest therein.

Division of Naval Auxiliary, Naval Reserve and Army Transports:

Encouragement and development in co-operation with the United States Navy and War Departments of an adequate merchant marine naval auxiliary, naval reserve, and army transport service.

Operations of Board relate to design, construction and manning of vessels, having special reference to naval auxiliaries, army transports and establishment of a naval reserve.

Office of Chief Clerk:

General supervision of clerical establishment, appointments under Civil Service rules, purchase of supplies, custody of offices, mails, files, routine correspondence, etc.

Disbursing Office:

Audit and payment of all accounts for salaries and other expenses of the Shipping Board.

Analysis of cost of the various operations of the Board.

Financial arrangements and general accounting connected with the receipts and disbursements arising under appropriation of $50,000,000 for upbuilding of American Merchant Marine.

Division of Dockets and Documents:

Clerk of Court duties pertaining to the Division of Regulation of Transportation and the Division of Foreign Discrimination.

Custody, file and issue of all "orders," "decisions," and dockets of cases pending before the Board.

Receipt, classification and availability of reports and agreements filed with Board under provisions of Shipping Act.

REVIEWS

The March, 1916, issue of the "Pan-American Record," the publication of the Pan-American Petroleum and Transport Company, contains an interesting account of the bringing under control of Cerro Azul No. 4, the great oil well which reached the enormous output of 260,000 barrels every twenty-four hours before it was finally brought under control through a simple but effective device.

Row and Davis, Engineers, Inc., of 90 West Street, New York, have just published two interesting bulletins, copies of which may be obtained on request. Bulletin No. 51, "The R. & D. Paracoil Evaporator" for single or multiple effect operation, shows and describes the evaporator thoroughly. The most interesting feature, perhaps, is the patented new type of manifold, which is mounted on a hinged door to facilitate inspection and cleaning. Bulletin No. 52, "The R. & D. Paracoil Feed Water Heater," fully describes the shell, manifolds, coils, connections and fittings of this well-known heater. These bulletins should prove of interest to every engineer interested in feed water heating and water distillation.

"The Navy," a well-known magazine devoted to naval subjects, changed hands at the first of the year, Mr. Ward having disposed of his interest to Mr. A. K. Hill, who will hereafter conduct the business. The name of the magazine has been changed to "The Navy and Merchant Marine," and will have a section devoted to this kindred subject. Volume one, number one, of the new publication contains its declaration of policy and a discussion of the recent shell contract award to a British firm.

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SHIPBUILDING STATISTICS

Shipbuilding returns, as issued by the Government and published in commerce reports, show some very interesting figures, especially if certain portions of the returns are eliminated in order to arrive at a satisfactory tonnage figure to use as a basis of comparison.

The steel shipbuilding concerns of the United States, according to commerce reports, had on hand or under contract 403 vessels of 1,495,601 gross tons on the first of January, 1917. If we eliminate car barges, coal barges, tugs, ferries and all craft under 1,000 tons gross burden we find that the shipyards had under way or on order 271 vessels of 1,428,268 gross tons.

The following table will illustrate the distribution of this work:

	No.	Gross Tons.	Average Size.	Per Cent of Total.
Atlantic and Gulf......	150	830,970	5,560	58.20
Great Lakes	47	163,150	3,450	11.41
Pacific Coast	74	434,148	5,866	30.39
Totals	271	1,428,268	5,270	100.00

Of these 271 ships, 90 of 427,774 gross tons, or approximately 30% of the tonnage on order is admittedly for foreign owners. A great many steamers, however, are given in the returns as being for "builder's account," and it is impossible to tell how many of these, if any, are to be ultimately turned over to foreign owners. It will be noted that the average size of ships building on the East and West coasts is much larger than those under construction on the Great Lakes. This is largely due to the fact that the Great Lakes yards have on order a considerable number of vessels restricted to the Welland Canal size.

In wooden shipbuilding the Pacific Coast holds a decided lead in point of tonnage, although the East leads in numbers. Eliminating everything under 500 tons gross register, we find the wooden tonnage under contract on January 1, 1917, to have been as follows:

	No.	Tonnage.	Average Size.	Per Cent of Total.
East and Gulf Coasts......	97	100,385	1,056	47.78
Pacific Coast of the U. S.	64	107,238	1,675	52.22
Totals	161	207,623	1,227	100.00

Eighteen of these ships with a gross tonnage of 38,800 were returned as being for foreign ownership. This is 13.82 per cent of the total.

Indications are that the Pacific Coast has improved its percentages slightly during the past three months.

THE LOAD LINE QUESTION

The committee on load line which was brought into existence through Secretary of Commerce Redfield has made its recommendation to the Shipping Board and in this connection it is interesting to note that the Canadian and Australian governments are carrying on negotiations relative to the same subject. The report of the American load line committee is a model of brevity and good sense, and reads, in full, as follows:

"Article 1.—Sea-going ships.

"As the question of determining the proper loading for various types of ocean-going vessels has been the subject of an exhaustive investigation conducted by the British authorities, and,

"As it appears unnecessary to repeat the same work in this country, and,

"As the United States is already a member of an international congress upon this subject, which would have met before this time, but for the present war in Europe, and,

"As it is generally conceded in maritime circles that the present loadlines, as established by the British practice in general render the vessels safe and seaworthy.

"Your committee therefore recommends:

"That the United States adopt a method for the determination for free board of ocean-going vessels which will give, in general, the same loadline as that established by the present British practice, this method to remain in force until such time as an international commission shall be called to establish an international loadline.

"As British tables at present in use are recognized as being somewhat cumbersome, they would need some revision in order to conform to the present-day American practice in shipbuilding.

"Article 11.—Coastwise, lake, bay and sound vessels:

"As vessels engaged in the coastwise, lake, bay or sound trade are not only operating under different conditions, but are in most cases of a different type of construction when compared with ocean-going types, and,

"As any set of free board tables based upon ocean-going types would be inapplicable to such vessels, and,

"As the operations of such rules and tables would involve a thorough and exhaustive examination of existing vessels, in order to establish what may be called the American practice in loading and operating such vessels, and,

"As proper, just and safe loadlines can be established only after an investigation has been made, and the results carefully analyzed by proper scientific methods, and,

"As such an investigation will necessarily take some time and involve some expense.

"The committee recommends:

"That the present committee be continued and conduct under such an investigation, and that the Shipping Board appoint one or more of their number to sit with the committee in their deliberations.

"That a fund be established to take care of the necessary expense involved in such an investigation.

"That, owing to the importance which your committee attaches to such an investigation, if it is deemed improper for the commission to apply any of its funds for this purpose, the committee be authorized to take such steps as are necessary to raise such funds."

THE FUTURE OF AMERICAN SHIP OPERATING

(Extract from an Address Delivered by Mr. Charles M. Schwab at the Lotos Club, New York.)

This is a time for great vision, for study and preparation. No man can foresee the problems with which the United States is face to face.

We have one-twentieth of the population of the world and one-third of its tangible wealth.

When peace comes, all other nations will contest with us the trade supremacy of the world.

Many methods will be suggested by which we may retain our present position and make it more secure. But I desire to make a concrete suggestion.

I am a shipbuilder. The Bethlehem Steel Corporation is building fully one-third of all the ships now under construction in this country. We are completing every week one 10,000-ton merchant ship fully equipped, besides battleships, submarines, and smaller vessels.

But we must note these striking facts:

More than one-half of all the ships building in the United States today are for foreign owners.

Statistics show that the American merchant marine on June 30th, 1914, amounted to 2,027,000 gross tons, and on June 30th, 1916, it is credited with 2,853,000 gross tons, an increase of 826,000 gross tons. But this growth is not all due to new building; 622,000 gross tons was due to the transfer of foreign vessels (mostly American owned) to American registry. The increase due to building is only 204,000 gross tons.

Of course, so long as the war lasts and the United States remains neutral nothing will prevent a tremendous increase in the American merchant marine. The real point, however, is that if present dues, wages, and other restrictions upon vessels flying the American flag prevail after the war American owners will again transfer their vessels to foreign registry.

Successful ship-operating is dependent wholly on the ability of American registered ships to compete with foreign bottoms. When the wage item alone, under American registry costs under ordinary conditions, in the neighborhood of forty per cent more than British or Norwegian owned vessels, it is not difficult to see the outcome of the competition.

To meet this situation I suggest as one step in advance—that ships flying the American flag be permitted to go through the Panama Canal at lower tolls than foreign ships. The Panama Canal is destined to play a larger and larger part in American commerce and such a plan would assist American ships to maintain the American standard of wages, and thus be the better able to take care of themselves in world competition. We built the Panama Canal; why not let American trade benefit by it?

ERRATA

In the March issue of the Pacific Marine Review, page 67, appeared an item that the American-Hawaiian Steamship Company paid the "Strathalbyn" $88,925.50 in settlement of judgment and $23,577 in settlement of cross libels. This is in error. Damages to the "Strathalbyn," including demurrage and interest, were fixed by the court at $121,793.97 and to the "Virginian" at $69,519.97. The "Virginian" has to pay the "Strathalbyn" one-half of the excess or about $26,000. In addition the "Virginian" had to pay the "Strathalbyn" one-half of a claim for damage to the cargo of the "Strathalbyn," about $4200 including interest, and a further sum for costs, making a total payment by the "Virginian" in satisfaction of judgment of about $32,500. There are yet to be settled some claims for death, personal injuries and personal effects amounting to about $8,000, of which the "Virginian" will have to pay one-half.

Shipping Notes

During the past month the Government has let contracts for ten of the great fighting craft that are to form the backbone of the American Navy. The Seattle Construction and Dry Dock Company is to build two scout cruisers; the Union Iron Works Company, two scout cruisers; the William Cramp Ship and Engine Building Company, two scout cruisers; the Fore River Shipbuilding Corporation of Quincy, Massachusetts, one battle cruiser; the New York Shipbuilding Corporation of Camden, New Jersey, one battle cruiser, and the Newport News Shipbuilding and Dry Dock Company two battle cruisers.

The Federal Shipping Board has been gathering information relative to the capacity for future work of the wooden shipbuilding plants along the Pacific Coast. Considerable comment has arisen in the daily press over this phase of the Shipping Board's activity and such headlines as "To Build 1,000 Ships" are quite common. The $50,000,000 at the disposal of the Shipping Board would only construct 100 of the type of craft indicated, but there is certainly this much to say regarding the wooden ship, that the raw material at hand is practically inexhaustible and the ability to turn the vessels out would only be hampered by the scarcity of skilled labor and the inability of engine makers to keep up with the demand.

Arthur M. Sherwood, Donald M. Green and Charles E. McCulloch filed articles of incorporation of the Coast Shipbuilding Company at Portland on February 24. The capitalization is $400,000 and the three gentlemen named above, together with James B. Kerr and A. L. Mills, compose the directorate. Mr. H. E. Pennell, who has been identified with local shipping and lumber interests for years, will be the managing head of the new concern. It is expected that the new yard will turn out vessels to their own account to be sold or operated as circumstances demand.

The Cunard Steamship Company has ordered two 8,800-ton deadweight carriers from J. F. Duthie and Company of Seattle.

The Canadian Government has let contracts for two large auxiliary schooners, one to be built at the Wallace Shipyards, North Vancouver, and the other at the Cameron-Genoa Shipbuilders Ltd. of Victoria.

The City Council of Oakland, California, decided on March 16 that the proposition of Mr. R. L. Stone to lease a large portion of the western waterfront for a term of 25 years was not in accordance with the best interests of the harbor.

Governor Withycombe of Oregon reappointed Messrs. Edward C. Judd of Astoria, C. G. Wilson of Linnton and Jacob Spier of Portland as members of the Oregon State Board of Pilot Commissioners. Mr. W. E. Mahoney of Portland is Secretary of the Board.

American firms have formed a pool to cover 73 per cent of the insurance on eight wooden auxiliary schooners of A. O. Andersen and Company's fleet. The balance of the insurance will be effected in Denmark. In connection with this arrangement, Mr. Arnold Reimann, manager of the American interests of the Andersen Company, stated: "One important feature of this arrangement from our standpoint is the fact auxiliary vessels will not have to be convoyed in and out of the Columbia river or other harbors by a tug, as has been exacted by some insurance policies placed on auxiliary vessels. Also rates have been from 8½ to 9 per cent, while through our pool and the assistance of Danish shipping firms we will be covered at not to exceed 6½ per cent."

The establishment of a State nautical school in Seattle has been assured through the action of the Legislature of the State of Washington. The movement for securing this school was brought to a successful issue largely through the efforts of the Shipmasters' Association of the United States.

Bills have been introduced in both branches of the California State Legislature providing for a California State nautical school. These bills provide that the matter would be under charge of a board composed of the Governor of the State, the Chairman of the State Board of Harbor Commissioners and the President of the State Board of Education.

The value of exports from the United States carried in American ships in the calendar year 1916 was $656,291,026. This is slightly over 15 per cent of the total water-borne export trade as compared with 12 per cent for 1915.

Inaugurating the C. Henry Smith Line from Puget Sound to South America, the Norwegian steamer "Governor Forbes" sailed on March 6 with lumber and general cargo from Port Townsend. She called at San Francisco for additional cargo. The "Baja California" sailed on March 7 from the same port for the west coast of South America.

The Atlantic and Pacific Steamship Company (W. R. Grace and Company) in 1916 earned $2,458,204 net, which is equivalent to 33.73 per cent, after deducting fixed charges, on the $1,500,000 common stock, as compared to 1.52 per cent in 1915. A total of $1,751,400 was allowed for depreciation and new construction, as compared with $351,400 for the previous year.

The equipment of the American Line steamers "Kroonland" and "Finland" as oil burners has at last been completed. These vessels have been going to have oil burners for over a year, but the incessant demand for tonnage prevented their lay-off and the oil-burning equipment lay on the American line pier for over a year. Oil will be carried in the double bottoms of these boats, but it is doubtful if the bunker space will be opened up for cargo.

The annual shipbuilding review in the Glasgow Herald affords some interesting shipbuilding data. The world's shipbuilding for 1916 is summarized as follows, the figures being for ships launched and finished, not on order or building:

	Vessels	Gross Tons
Great Britain and Dominions	510	619,336
United States	1,213	560,239
Japan	250	246,234
Holland	297	208,180
Italy	30	60,473
Norway	70	44,903
Sweden	35	40,090
France	10	39,457
Denmark	30	37,150
Germany	18	35,950
Spain	4	10,071
China	38	7,861
Total	2,505	1,909,944

During 1916 there were 1,149 vessels of 2,082,683 tons lost from war causes and as Lloyds estimate that on June 1, 1916, the world's merchant shipping amounted to 48,683,136 gross tons, the net loss from war causes for the year 1916 was about one-half of one per cent of the total.

As far as ships are concerned, Japan switched during 1916 from a buying to a selling nation. During the last calendar year, the Island Kingdom's shipowners purchased eight craft of 1,000 gross tons or over with a total tonnage of 34,877 tons and sold twenty vessels of 74,277 gross tons. For the five-year period from 1912 to 1916 inclusive, however, Japanese owners purchased from abroad 135 ships of 456,809 tons and only sold 23 vessels of 81,873 tons, a gain to their merchant marine through foreign purchase in excess of sales of 374,936 gross tons.

TO RETAIN STEAMSHIP LINE

The Interstate Commerce Commission has granted permission to the Southern Pacific Railroad to continue its ownership of the Morgan Steamship Line between New York, New Orleans and Gavleston, provided that the railroad will correct within 60 days certain practices objected to by the Commission.

The Panama Canal Act provides that railroads shall not be allowed to own steamship lines if such ownership prevents free competition, and that the Interstate Commerce Commission shall have authority to authorize the continuance of such ownership.

The Southern Pacific Company petitioned the Interstate Commerce Commission to be allowed to own and operate the line.

The Commission's decision finds that the railroad's control of the steamship lines does not tend to reduce competition in this instance, but that there is, on the contrary, active competition for transcontinental freight between the steamship lines and the railroad lines of the Southern Pacific.

"The correction of objectionable practices," the decision says, "would leave no basis of record to justify the withholding of the requisite finding, under the act, that the existing service of these steamship lines between New York and New Orleans and New York and Galveston is in the interest of the public and of advantage to the convenience and commerce of the people.

"The case will be held open for sixty days, during which time the petitioner will have an opportunity to readjust the practices in question so as to bring the service into full conformity with the provisions of the act to regulate commerce, as amended. At the expiration of that time the Commission will determine what final action should be taken."

The chief practice referred to as objectionable is the method of billing from New York to Galveston and rebilling at Galveston to points west.

The Commission found that no competition existed in the case of lines operating between New Orleans and Havana.

The Merchants' Association appeared at the hearing given by the Interstate Commerce Commission in February, 1916, in favor of the request made by the Southern Pacific Company as advantageous to the commerce of New York City.

PACIFIC MAIL FINANCES

That American steamship companies are not being blinded by the present period of prosperity is indicated by the conservatism of their attitude towards the future of their fleets. A good example of this carefulness is found in the action of the Pacific Mail Steamship Company, as described in the recent report to stockholders of President George J. Baldwin. From this document we extract the following:

"During the period covered by this report there has been an advance in rates in certain commodities moving to and from Central America. However, the increase has not been at all commensurate with the advance in rates throughout the world generally, and in this connection it is to be noted that your company has maintained its regular schedule to ports of call in Central America in order to take care of patrons of many years standing, even in the face of the fact that opportunities were presented from time to time which would have permitted of larger returns in other service.

"Viewing the general conditions through which we are passing at the present time, and in line with the conservative policy adopted by your directors, it has been deemed expedient at this time to appropriate the sum of $453,339 from income to be applied to extraordinary depreciation of steamers, so that in the event of a sudden decline in value of bottoms your company will under all conditions rest upon a safe and conservative basis.

"At a special meeting of the stockholders held May 16, 1916, a resolution was passed changing the fiscal year of the company to correspond with the calendar year, which is in line with the present tendency of all corporations. In accordance with the action of the stockholders at a special meeting held May 16, 1916, which authorized an increase in the company's capital stock, the sum of $2,000,000 was realized, which was applied towards the purchase of the vessels in the trans-Pacific service. Resumption of trans-Pacific service was made possible by the purchase of the 'Venezuela,' the 'Colombia' and the 'Ecuador,' this service having been abandoned by your company at the time of the sale of the 'Mongolia,' 'Manchuria,' 'Korea,' 'Siberia' and 'China.'"

The general balance sheets of the Pacific Mail Steamship Company for December 31, 1916, and April 30, 1916, are given below:

Assets—	Dec. 31, '16	Apr. 30, '16
Permanent and long-term investments:		
Real property and equipment:		
Steamers	$6,437,686	$4,692,520
Other floating equipment	9,797	145,938
Real estate and other property	158,008	141,667
Total	$6,605,492	$4,980,120
Deduct:		
Reserve for accrued depreciation	2,487,787	2,002,318
Net real property and equipment	$4,117,704	$2,977,812
Other investments:		
Securities unpledged	$ 264,451	$ 157,784
Deduct:		
Reserve for depreciation of securities	100,000	100,000
Net other investments	$ 164,451	$ 57,784
Total	$4,282,155	$3,035,597
Working assets—		
Cash	$ 106,494	$ 215,505
Loans and bills receivable	300	600
Traffic balances owed by other companies	244,968	200,453
Net balances due from agents and pursers	65,510	63,551
Insurance claims against underwriters	211,832	200,497
Miscellaneous accounts receivable	75,848	114,314
Materials and supplies	57,870	44,970
Other working assets	2,485	210
Total	$ 765,310	$ 840,100
Deduct:		
Reserve for doubtful accounts included in above	200,000	200,000
Net amount	$ 565,310	$ 640,103
Deferred debit items—		
Temporary advances	$ 13,744	$ 12,704
Rents paid in advance	127,205	142,724
Insurance premiums paid in advance	92,018	25,039
Special deposits	....	126,815
Open voyage expenses	263,522	66,144
Other deferred debit items	10,177	6,172
Total	$ 506,669	$ 370,600
Grand total	$5,354,135	$4,055,301
Liabilities—	Dec. 31, '16	Apr. 30, '16
Stock—		
Capital stock	$2,850,000	$1,000,000
Premium on capital stock	150,000	....
Total	$3,000,000	$1,000,000
Working liabilities—		
Loans and bills payable	$ 300,000	$1,300,000
Audited vouchers and wages unpaid	78,807	85,926
Traffic balances owed to other companies	14,802	10,765
Miscellaneous accounts payable	15,597	18,966
Matured dividends unpaid	37,137	50,185
Other working liabilities	60,546	29,280
Total	$ 506,980	$1,495,132
Deferred credit items—		
Open voyage revenues	$ 409,672	$ 160,320
Other deferred items	146,905	109,272
Total	$ 556,578	$ 269,592
Profit and loss—		
Balance, as per profit and loss account	$1,290,576	$1,290,576
Grand Total	$5,354,135	$4,055,301

PORTLAND NOTES

Upon the stage of the water depends the launching of two ships now ready for the water. The "Beta" at the Peninsula and "Lauritz Kloster" at the Northwest Steel are both ready. The Willamette has been lower this year than in many seasons, and at least two feet more water is needed before launching can be safely handled.

Ship-caulkers on the Columbia river have been granted a wage increase of $1 a day, the scale now being $6. All yards joined in the increase.

Broughton & Wiggins, owner of the steamer "Ernest H. Meyer," are planning on duplicating that craft at an early date. The Meyer is their first venture in the ocean trade.

Kluver & Co., of Christiania, have purchased the motorship "Astri" from A. O. Anderson & Co., for $315,000. The vessel, building at Astoria, will be launched shortly.

Supple, Ballin & Lockwood laid first keel in their new yard March 3. The keel was made from timbers 124 feet in length, scarfed 10 feet, and measures 286 feet over all. Two additional ways are being put in and additional contracts are expected shortly.

The Coast Shipbuilding Co., organized by Arthur M. Sherwood, Jr., Donald M. Green, Charles E. McCulloch, J. B. Kerr and A. L. Mills, and incorporated for $400,000, has filed papers. The new firm expects to open a wooden shipbuilding yard within two months.

Purchase of the first two steamers building at the Northwest Steel Co. for Lauritz Kloster at a sum of $205 per ton by the Cunard Line has been announced. Both vessels are 8800 tons deadweight capacity and will be launched within thirty and ninety days.

Awaiting the arrival of gear and machinery, the first Columbia Engineering Works wooden motorship is being fitted with cabins. She is ready for the water as soon as her machinery arrives.

Launching of the motorship "Margaret," built at Astoria by A. O. Andersen & Co., occurred March 3.

Building of a second machine-shop at the Albina Engine & Machine Works has begun. Arrival of keel plates is looked forward to shortly, and the keel for the first steamer will be immediately laid.

NEW PILOTS APPOINTED

On March 15 the Board of State Pilot Commissioners appointed Eldon G. Freeman and Edward W. Mason as pilots to fill the vacancies caused by the deaths of John E. McCulloch and James M. Hays. Eldon G. Freeman is a commander in the U. S. Lighthouse Department and Captain Eddie Mason is one of the best known mariners on the Pacific Coast, his popularity with the travelling public and his accident free career having served to make Captain Mason and the steamer "Beaver" of the San Francisco and Portland Steamship Company a sort of Pacific Coast institution.

Joseph Supple, a well-known Portland shipbuilder, and a member of the new firm of Supple, Ballin and Lockwood.

Mr. C. H. Murdock, of Swansea, Wales, has been sent to Seattle to join the Lloyds' register forces in that territory. Late last Summer, W. S. P. Collings was sent out from Glasgow and in January, Mr. John Whitehead from an English port. The intense activity in shipbuilding, both steel sity of a larger staff representing Lloyds in the and wood, in the Northwest has forced the neces- Seattle district.

WAR RISK RATES

Between Atlantic ports and the Panama canal, three-fourths of one per cent; between Atlantic ports and the United States ports on the Gulf of Mexico, half of one per cent; between Atlantic ports and ports in the Far East, Australia or the east coast of Africa, by way of Panama, one and one-half per cent; by way of Magellan or Cape of Good Hope, two and one-half per cent.

Between Australian coast and the west coast of South America, three-fourths of one per cent.

Between United States gulf ports and Mexican gulf ports, one-fourth of one per cent; between United States gulf ports and Central American east coast ports, half of one per cent.

Between United States Atlantic ports and all other western hemisphere ports than those named above, one and one-half per cent; between all American ports and the west and south coasts of Africa, one and one-half per cent.

FIREMAN'S FUND
Insures Hulls, Cargoes,
HEAD OFFICE: CALIFORNIA AND SANSOME
JOSEPH HADLEY, European Agent
3 LOTHBURY, E. C.
LONDON
G. KIRKHAM SMITH, Special Agent
407 LEWIS BUILDING
PORTLAND, ORE.
FRANK G. TAYLOR, GENERAL AGENT FOR WASHINGTON, OREGON, ALASKA

Cost of Repairs

MARINE underwriters, not only in this country, but in all maritime countries, are becoming very much exercised over the greatly increased and still increasing cost of repairs to vessels for which they are liable, and are scanning repair accounts very closely. A solution of the difficulty has not yet been found, or if it has been seen, it has not been applied.

There is no doubt that the present European war is responsible for the greater part of this increase. In the first place, our Eastern iron and steel plants are overburdened with munitions orders on which huge profits are made, and it is not surprising that the output of steel and iron plates and other materials necessary in the construction of steamers is curtailed. Stocks which were on hand at the beginning of the war are practically exhausted, and if orders are accepted they are at a price very much in excess of those obtaining some eighteen months ago.

The war is also responsible for the great curtailment of tonnage, not only by casualties which cause destruction of steamers, but by the interning of the German merchant marine and the commandeering of a large number of British bottoms. This curtailment of tonnage has caused freight rates to increase to such an extent that fabulous prices are paid for any craft that will float, and contractors ask and obtain almost any price for new construction. The shipyards of the United States are crowded with orders for new tonnage and new plants are being prepared to participate in the game. Added to this is the present condition of unrest among the mechanics and laborers of several of the shipyards on this coast, which may become general and which will delay construction. It is only within the past few days that a general strike among the employees of the railroads has been averted by an appeal to the patriotism of the railroad managers and generous concessions on their part. Had this strike as planned been carried out, the congestion would have been such that material for construction and repairs could not have been procured, and ships needing repairs would either have been laid up indefinitely or the cost of repairs would have been almost prohibitory. The settlement of this trouble has been made at the cost of increased wages, and settlement of the other difficulties will carry with it the same penalty, and this entire increase must be taken care of in the construction and repair accounts.

Almost, if not all, of the contracts entered into for new construction contain a time limit with a penalty for failure to deliver on time and a bonus for pre-delivery. Most of the yards are now crowded to their utmost capacity with new work, and the quantity of material on hand is by no means large. If, therefore, a contractor is asked to bid on a large repair job he must consider, if he has to use material provided for new work, whether or not he can replace it without loss of money or time. He must also consider a possible loss, either actual in the payment of a forfeit, or prospective in his failure to earn a bonus. It is only business that he should take into consideration all contingencies and if he errs it is not likely to be on the wrong side.

There seems to be at present no prospect of relief from this excessive cost, but so far as the marine underwriter is concerned it would seem that he could obtain some relief as to the amount he is liable for by insisting on a policy value somewhere near the actual value of the vessel. Take, for instance, a steamer which has been insured for several years on a value of $400,000, and in need of repairs through perils insured against which some two years ago, or even less, would have cost $50,000, but under present conditions would cost $100,000, the liability of the underwriter in the first instance would have been $1,250 under a policy for $10,000, while at present the liability would be double that. If the policy value had been increased in proportion as the

INSURANCE COMPANY
Freights and Disbursements
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ATLANTIC MARINE DEPARTMENT
37-43 WALL STREET NEW YORK
AND BRITISH COLUMBIA, 264 COLMAN BUILDING, SEATTLE, WASHINGTON

market value increased than that same steamer would easily carry a policy value of double that amount and the liability of the same underwriter would not be increased. It is, of course, impossible to increase values during the life of time policies without the consent of the assured, but as policies are renewed underwriters could insist on a policy value more nearly commensurate with the actual value, thus keeping their liability, in case of particular average, down to more nearly normal conditions. If policy values were increased as market values increase, the situation would be relieved of many incongruities. In a foreign exchange it has recently been noted that a steamer insured on a valuation of £38,500 was valued for contributory purposes in general average at £225,000. Had this steamer suffered damage by perils insured against, to repair which in these abnormal times would have cost say £40,000, the assured could have claimed from the underwriters as particular average the full face of the policies and would then have had a value remaining several times greater than the actual value of the vessel in normal times. Had this steamer been valued at even £100,000, less than half her estimated value, the underwriters would have paid but 40 per cent of the face of the policies instead of a total loss. This is an exaggerated case, but there are numerous others.

Marine underwriters appear loath to disturb existing relations. If an attempt is made to increase policy values to any extent, the assured expresses dissatisfaction and the good will is strained or maybe broken. It may be it is considered that these abnormal times will not last for any great length of time, but certain it is that marine underwriters, while looking askance at the very heavy claims for repairs, do not appear to be taking any steps to reduce their liabilities.

MARINE MISHAPS

"CHINA"—Am. Str. During December, 1916, while on passage from San Francisco for Hong Kong, experienced very heavy weather, causing damage to boilers and machinery. Estimated cost of repairs about $18,000.

"CHINA"—Am. Str. On Jan. 8, 1917, was in collission with a Japanese tug in Shimoneseki Straits. The tug sank and several members of the crew were lost. Value of the tug about $25,000.

"CUZCO"—Nor. Str. From San Francisco, Feb. 2nd, for Valparaiso, went ashore at Salaverry and at last advices had not floated.

"ECUADOR"—S.S. From San Francisco, Feb. 12th, for Manila via Japanese and Chinese ports, went ashore Mar. 12th at the entrance to the Yangtze Kiang river and was later floated. It is reported that some of the cargo was lightered and that the steamer suffered some damage both to bottom and machinery.

"ENTERPRISE"—S.S. At Hilo, Mar. 4th, from San Francisco, reports intermediate shaft cracked. The steamer will take on cargo and will be assisted to San Francisco by the steamer "Lurline."

"J. M. GRIFFITH"—Bktn. From Seavia for San Francisco, arrived at Port Townsend, Mar. 14th, leaking badly and with pumps disabled.

"JOHN A. CAMPBELL"—Schr. From Pt. Gamble, Feb. 25th, for Sydney, put into San Francisco, Mar. 10th, leaking badly.

"NORTHLAND"—Str. From San Francisco, Feb. 23rd, for Seattle, was in collision on the morning of the 24th with the steamer "Senator" and was obliged to return to San Francisco. Cargo was discharged and repairs made. Estimated cost of repairs, $3,500.

"PERSIA MARU"—Jap. S.S. From Hong Kong, Jan. 31st, for New York via Chinese and Japanese ports and San Francisco, arrived at San Francisco Mar. 1st with fire in the cargo. A part of the cargo was discharged and the badly damaged portion, consisting of beans, was sold at this port. The remainder of the damaged cargo was reconditioned and forwarded, part of it by rail.

"RAYMOND"—Str. From San Pedro, Feb. 23rd, for San Francisco, went ashore near Pt. Sur on the night of Feb. 24th. Prospects of saving are reported to be good.

"SENATOR"—S.S. From Seattle, Feb. 21st, for San Pedro direct, was in collision on the morning of Feb. 24th with the steamer "Northland", northbound, and was obliged to put into San Francisco for repairs. Estimated cost of repairs, $7,000.

"SONOMA"—S.S. From Sydney, Feb. —, for San Francisco, arrived at Honolulu, Mar. 13th, with starboard propeller gone. Will proceed to San Francisco under port engine.

"WILLAMETTE"—S.S. From San Pedro, Mar. 8th, lost propeller off Santa Barbara and was towed to this port by the steamer "Klamath."

"GOLDEN GATE"—Str. From San Diego for Mexican ports, was sunk, Mar. 14th, at Ensenada harbor. A shipment of gold on board was saved and efforts are now being made to salve the steamer and remaining cargo.

Freight Report

By PAGE BROTHERS

San Francisco, March 21st, 1917.

SINCE our last circular, dated February 20th, one Norwegian steamer, "Bessa," has been chartered in Europe to load at San Francisco and/or New Orleans a full cargo of barley to Gothenburg, Sweden. The cargo has been sold by E. Clemens Horst Co. No charters have been drawn from the North for grain.

A rather small business has been done in time chartering. Mitsui & Co. chartered the new Japanese steamer "Ayaha Maru" for one round at 18 yen, and Frank Waterhouse & Co. chartered the "Gishun Maru" for six to eight months at 17½ yen.

Balfour, Guthrie & Co. chartered their new sailing vessel, "Columbia River," from Newcastle with coal to a direct nitrate port at 68/9, and one or two vessels, still unnamed, it is reported, have obtained as high as 72/6 for the same voyage. One of the Union Steamship Line was chartered from Newcastle to Honolulu by Hind, Rolph & Co. at a reported rate of 40/-per ton, and some smaller sailers, it is said, have since obtained 47/6 to 50/- for the same business.

Steamer "Hilonian," formerly reported as loading for Cuba and New York, was withdrawn and proceeded hence in ballast to load at a nitrate port to New York or adjacent port, at $21.50, by W. R. Grace & Co., and the latter firm chartered motorboat "Sierra" for their own account, to carry a cargo of nitrate from Chile to San Francisco or Puget Sound port, at $15.00 per ton. Grace & Co. chartered schooner "Columbia" from Willapa to Iquique at $31.50. J. J. Moore & Co. chartered "C. D. Bryant" from Eureka to Sydney or Melbourne at 130/-, the "Thrasher" on lump sum, from Puget Sound to Sydney, reported at about $15,000, and "E. R. Sterling" from Puget Sound to Sydney at 100/-, (chartered some time ago), and "McLaurin" from Noyo to Melbourne at 130/-. Hind, Rolph & Co. chartered schooner "C. F. Crocker" from the North Pacific to Sydney at 125/-. The China Import & Export Lumber Co. chartered Japanese steamer "Sommedono Maru" from Ostrander at $25.00 per thousand feet to Shanghai.

The Norway Pacific Line chartered their steamer "Bayard" for a full cargo of case oil and by-products from San Francisco to Manila at about 80c per case, so the street reports. She will bring back general cargo from Manila to San Francisco at a lump sum. E. C. Evans & Sons have put steamer, "Nippo Maru," on the berth from San Francisco to Tientsin.

Sales of vessels have been slow, because of the action taken by the Shipping Board as in the case of steamer "Thordis," on which every payment has been made excepting the last by the Norwegian owner, and that he stands ready to pay as soon as furnished with a bill of sale by the builders. This they also are ready to give, being deterred only by the action of the Shipping Board, which claims that she is an American steamer. The "Bessa," built by the Union Iron Works, is also suffering delay for the same reason. The "Thordis" has been ready several days to proceed to load her cargo from Portland to Bombay, and her delay is a very expensive one, for which settlement will have to be made later. The almost certainty of our being at war with Germany is also restricting business.

President G. S. Dearborn and a party of American-Hawaiian Steamship Company officials, are now on the Pacific Coast making a business inspection trip covering San Francisco, Portland and Seattle.

Mr. J. H. Hyde, the well-known Tacoma shipbuilder and inventor, has patented a device which he claims will render useless the efforts of mine sweepers to clear a channel from mines. The patent and the right to use it has been patriotically turned over to the government by Mr. Hyde.

Mr. James S. Grant, formerly chief clerk of the Dodwell Dock and Warehouse Company, is now chief wharfinger of piers B and D at Seattle for the Pacific Steamship Company.

The Port of New Orleans

NEW ORLEANS is a port that has always held a goodly measure of interest for travelers the world over. This is due partly to the romance and distinctiveness which marks the southern city, but still more so to her splendid strategic position as the southern gateway to the great interior valley of the United States. Another point of extreme interest about New Orleans is that she is the only large city in the country, outside of San Francisco, that has retained complete control of her water front.

New Orleans occupies a position that is unassailable in a geographic sense, as the country, capital and produce tributary to her trade is practically inexhaustible. She has developed from a "river town" into a great seaport and at the same time has become a railroad center of importance. The revival of river traffic which has manifested itself during the past few years must still further increase the power of New Orleans as an exporting and importing city.

New Orleans is located 110 miles above the jetties at the gulf. She holds second place in value of exports and fourth place in imports among the ports of the United States. The river front under the control of the Port Commission, which controls the front under charter from the State of Louisiana, comprises over forty-one miles. There is seven square miles of developed harbor space in which the water varies in depth from 40 to 100 feet at the dock line and to about 200 feet in midstream. There is in all about five miles of wharf, three and one-half of which is covered with modern steel sheds.

The Louisiana Legislature created the Port Commission in 1896 and the Commission assumed control of the waterfront in 1901. In 1910 the Dock Board was authorized to make improvements and issue bonds and preparations were made to improve the facilities for handling, storing and shipping the greatest article of export, cotton. About two years ago actual work commenced on a great, modern warehouse system, the work being in charge of Ford, Bacon and Davis, the well-known engineering firm. The principal object to be obtained was to make New Orleans a deposit point for cotton. Between five and six million bales of cotton are grown annually in the territory that is naturally contiguous to New Orleans. In the past, cotton has swamped shipping at the great Mississippi river port in the Fall and Winter, shipments being negligible in the Summer and Spring. By creating immense warehousing facilities, where the cotton could be stored alongside the wharves, it is hoped that the export of cotton can be closely regulated to meet the demand and be more or less evenly distributed throughout the twelve months of the year. For the year ending June 30, 1911, 6,527,884 bushels of grain were exported from New Orleans and for the year ending June 30, 1915, the amount was 53,863,383 bushels. In order to properly care for this tremendous increase in grain, the port authorities are

Loading cotton. New Orleans waterfront is an interesting place.

The steamer "Momus," one of the steamers of the Morgan Line connecting New Orleans with New York.

planning large grain elevators. The final link in the port's waterfront system is the belt railroad, which, including spurs and sidings, has 62 miles of track and connects all the wharves and warehouses with each other and with the various railroad systems entering the city.

In the matter of sea connections, New Orleans is peculiarly well served. In this connection, the Southern Pacific Company played a prominent part by popularizing the sea trip between New York and New Orleans as a part of a trans-continental journey. This sea service has developed into an extensive freight and passenger business, the boats operating under the name of the Morgan Line.

Southern Pacific (Morgan) line steamers at a New Orleans wharf.

Great care has been exercised in the design of the vessels placed upon this run, as the passenger traffic had to be stimulated through the provision of every comfort and luxury. The boats were fitted to meet the conditions prevailing in the semi-tropic waters through which they were to run and a building program that called for bigger and better boats with each addition to the fleet was strictly adhered to.

Some of the vessels in the New York-New Orleans fleet of the Morgan line are the "Momus," "Antilles," "Creole," "Proteus" and "Comus." The "Comus" was built by the Newport News Shipbuilding and Dry Dock Company and is a single screw steamer 391 feet 6 inches long, 48 feet 3 inches beam and 27 feet 5 inches moulded depth. She is driven by a triple expansion engine with cylinders 32, 52 and 84 inches in diameter by 54 inches stroke.

The "Momus" and "Antilles" are sister ships and were built by the William Cramp Ship and Engine Building Company. These fine vessels are 410 feet

The steamer "Proteus" in midstream. The Morgan Line boats are popular with the travelling public.

Dining saloon of the steamer "Chalmette."

long by 53 feet 2 inches beam, by 25 feet 6 inches moulded depth, and are driven by triple expansion engines with cylinders 34, 57 and 104 inches in diameter by 63 inches stroke.

The "Proteus" is a Newport News product, being 390 feet 8 inches long, 48 feet 3 inches beam and 29 feet 9 inches moulded depth, and is driven by a triple-expansion engine with cylinders 33, 52 and 84 inches in diameter by 54 inches stroke.

The "Creole" was built by the Fore River Shipbuilding Corporation and is a twin screw boat 407 feet long by 53 feet beam by 26 feet 7 inches moulded depth, her engines having cylinders 27¾, 46 and 79 inches in diameter by 42 inches stroke.

The library on the Morgan liner "Momus."

These ships were all designed for use in tropical waters and great care has been taken in all questions pertaining to ventilation, refrigeration and roominess of quarters. The staterooms are large and airy, the dining rooms are located in the forward end of the superstructures securing fine light and a sufficency of ocean air. Every precaution has also been taken in respect to safeguards and the rigid "safety first" regulations that have earned such an enviable name for the Southern Pacific Railroad are paralleled in the management of this popular ocean route.

TWO HANDY FREIGHTERS

Two new freight vessels for the Southern Pacific Company—Atlantic Steamship Lines—are underway at the works of the Newport News Shipbuilding & Dry Dock Company. The keel of the first vessel was laid on January 27th, and it is expected that the keel of the second vessel will be laid about April 1st.

These vessels are built to meet a particular requirement of the Southern Pacific service and are somewhat smaller than the freighters built for this company in 1910, and are designed for a slower speed. The speed of the regular service vessels of this fleet, however, is exceptional.

The airy dining saloon of the "Comus."

The new vessels, which are to be named "El Almirante" and "El Capitan," are 380 feet over all, 51 feet beam and 33 feet 6 inches deep. They will have a cargo capacity of about 375,000 cubic feet, and a deadweight of about 6200 tons on 23 feet draft. The designed speed is 11 knots.

They are of the hurricane deck type, with three complete steel decks and an orlop deck in the forehold. Constructed with transverse framing, they have double bottoms under the engine room and for a short distance abaft the engine room. Feed water will be carried in the double bottom under the engine-room and in the after-peak. The fore peak and a deep tank abaft the engine

Solid comfort. The smoking room on the "Momus."

The S. S. "Momus" making her dock at New Orleans.

room will be fitted for carrying water ballast. Fuel oil will be carried in deep tanks forward of and abreast the boilers and in the after section of the double bottom.

As usual in coastwise vessels, the five cargo hatches will be supplemented by cargo ports, four to the upper 'tween-decks and eight to the lower 'tween decks. The covers to the cargo hatches in the hurricane deck will be of metal, as has been the practice of the Southern Pacific Company for many years.

The cargo handling gear will consist of twelve booms and ten friction geared single cylinder cargo winches. This type of winch, it is claimed, meets the requirements of the service more satisfactorily than the double cylinder winches which are now in general use.

The quarters of the officers and crew are in deck houses amidships and aft. The deck houses are roomy and well ventilated and well suited for trade in southern waters.

The lifeboats will be handled by mechanical davits, and the vessel will be fitted with wireless.

The machinery consists of a triple expansion engine 24½"x41½"x72"x48" stroke and two Scotch boilers 15'-9" diameter, 11'-6" long, oil burning, forced draft, with a working pressure of 200 lbs. "White" burners will be fitted, designed for using heavy Mexican oil. The Southern Pacific Company has had considerable success with "White" burners when using Mexican oil as heavy as No. 11 Beaume.

THE STORY OF THE BRISTLE

By Lew C. Hill, President, John L. Whiting-J. J. Adams Co., Boston.

In the United States a hog hardly lives long enough to get through being a pig before he becomes pork, bacon, ham, tenderloin and the various appetizing names he takes on. In the process he sheds his bristles. His bristles are so soft and short that few of them get into brushes, which is really a high-toned use for bristles. Instead of going into brushes, they are used as curled hair for the rather plebeian purpose of filling automobile cushions and they even get into mattresses sometimes, working through the ticking, pricking sleepers to unpleasant dreams. In other words, the bristles from the great packing establishments of this country are not adapted to making brushes.

The people of Russia are the true epicures of the world regarding pork diet. They enjoy, and demand, well ripened pork, which, to be truly appetizing, must be three or four years growing. Hogs which produce from three or four years life of foraging in fields and forests, the delicious pork eaten by Russians, grow at the same time the best brush makers' bristles in the world. But for the love of a people for well-ripened pork, the world would not have the splendid stiff bristle hair brushes, the excellent long bristle paint, varnish and kalsomine brushes, so necessary to it. The benefit brought to bristles from being grown in the cold northern parts of Russia and Siberia also assist in producing stiff elastic bristles, which wear out slowly. In Russia, as in the United States, there are white, black and gray hogs. The quality of bristles from them does not differ in consequence of color.

Northern Germany gives us bristles similar to Russia. Belgium and France grow shorter and finer bristles than Russia, from younger hogs, but of splendid quality. They are the kinds used in tooth brushes, artists' brushes and many important lines. Of late years brush manufacturers have gone to China for immense quantities of bristles, and as nearly all hogs there are black, that is the color of practically all bristles from that country. Everyone has read Charles Lamb's account of the discovery of roast pig in China, by finding one in a burnt house, and thereafter a house was burned containing a pig whenever the delicious roast pig was wanted. As long bristles of good stiffness come plentifully from China, it is fair to assume that its people like well-matured pork, and undoubtedly roast pork continues popular, as China is a very large producer of bristles.

Bristles before they can be put into brushes receive much attention from brush makers. Washing with soap and water, sorting colors and quality, separating lengths, remixing to get stiffness and details required in different brushes;

all these details are given attention by expert workmen. All the profits of a brush manufacturer may be lost in a bristle preparation department badly managed.

Attaching bristles to handles is accomplished by different methods, as required by different kinds of brushes. The varieties and sizes of brushes made are in the tens of thousands and constantly increasing. The art of brushmaking has been carried to such a state of perfection that all users expect and receive brushes exactly adapted to purposes required, and with no defects. To undertake to enumerate the different kinds of brushes made would take too much space, and the methods of making them is not of general interest.

While brushes are of very general use, every person using them every day of his life, there are only a few large manufacturers of brushes in the world. The details of their manufacture and difficulties of obtaining materials are the real discouragers of going into the business.

BIG FUTURE FOR BOILERS

The Babcock and Wilcox marine water tube boiler has been evolved from the land boiler built by the same company, and, in its earlier stages, possessed several features which a short experience in service showed could be greatly improved. The outside handhole plates with ground joints were replaced by handhole plates on the inside of the header, seated on asbestos gaskets. This change was considered desirable in order that the high steam pressure carried would tend to hold the handhole plate in its place rather than tending to carry it away.

In the earlier marine constructions, the tubes were too short to admit of proper baffling of the gases and, as a result, the stack temperatures were high. When tubes 9 feet long were substituted for tubes 7 feet 5 inches long, and what is known as the "Alert" type of baffling was introduced, a great advance was recorded. Later, rectangular handhole plates at the front were substituted for the composition screwed plugs necessary for the removal of tubes and the side casing was paneled with cast iron panels, arranged with lifting shutters, through which the soot could be blown off the tubes with the steam nozzle. Still later, these panels were hinged so that in port suitable brushes could be introduced and effect an absolute removal of the soot from parts not reached by the steam nozzle. All of these changes were suggested by experience at sea and have added greatly to the efficiency of the B. & W. marine boiler.

It was early recognized that in addition to its efficiency as a steam generator, the water tube boiler would have a preference for marine service on account of its lightness. This is a consideration of prime importance with high pressure steam, it being found that the Scotch marine boiler of any considerable power weighed from 58 to 75 pounds per square foot of heating surface and the Babcock and Wilcox boiler but 30 pounds per square foot of heating surface, both being filled to the steaming level. This feature is of paramount importance in the naval service, where the reduced weight enables heavier armament to be carried on the same displacement, and it is receiving more and more recognition in the merchant marine also.

The first B. & W. marine boilers installed in merchant vessels on the Pacific Coast were placed on the "Dirigo," built by John S. Kimball in 1897, and the "Charles Nelson," built in the same year for the late Charles Nelson, founder of the Charles Nelson Company, who are now operating a number of vessels on this coast.

Both of these early installations were wanting in the features herein described as improvements, yet they gave satisfactory service and the boilers of the "Charles Nelson," after about seventeen years of service, were installed in a new steamer, the "Mukilteo," and are still doing good service today. During the period that the "Charles Nelson" was operating under her own power, she was twice wrecked so that her boilers were twice submerged for long periods. After her second mishap she was rebuilt as a barge and her engines and boilers removed to a new boat, the "Mukilteo." The boiler installed in the "Dirigo" was still in use on that vessel when she foundered in Alaskan waters in 1915.

To date, over one hundred vessels on the Pacific Coast have been equipped with Babcock and Wilcox boilers, the list including quite a number of steam schooners and ferryboats. They are in use on all the Key Route ferries, on the Western Pacific ferry "Edward T. Jeffrey," in the Santa Fe Railroad's ferries "San Pedro" and "San Pablo" and in the "Alameda" and "Santa Clara" of the Southern Pacific ferry fleet. An interesting installation is that on the "Spokane," a large steamer built for the Alaskan tourist service, where she has been operating since 1900.

The large Matson Navigation Company's steamer "Matsonia" had six B. & W. boilers fitted. When these had been in actual service for about eighteen months, the Matson Navigation Company ordered the big 10,000-h.p. geared turbine drive steamer "Maui" from the Union Iron Works Company and such had been the success of the water tube boilers on the "Matsonia" that Babcock and Wilcox boilers were chosen for the entire steam plant of the new steamer.

Federal Radio Stations

RADIO has played such an important part in the conduct of the present European war and has assumed such an important place in the commercial intercourse of the world that matters pertaining to the development of its range of usefulness are always of the greatest interest. Perhaps no system of radio telegraphy has come to the front more rapidly during the past few years than that utilized by the Federal Telegraph Company. This concern, which utilizes and has developed the Poulsen system, has offices for the purpose of transacting commercial business in San Francisco, Los Angeles, San Diego, Phoenix, Portland, Seattle, Tacoma, and Honolulu. In addition to these stations, a great many freight and passenger ships plying the Pacific are using Federal radio apparatus with uniformly high records of accuracy and wide range.

In the matter of naval radio stations, the Federal Telegraph Company has equipped all of the high power shore plants and most of the battleships and cruisers of the new navy. In view of this success it is gratifying to note that the Federal is a California concern, that its headquarters are in San Francisco and its factory in Palo Alto, California.

It has been developed by San Francisco capitalists who are leaders in the financial and business circles of the city.

The list of Directors includes such well-known names as Francis Carolan, John L. Deahl, Washington Dodge, Alexander Hamilton, E. W. Hopkins, Chas. D. Marx, J. Henry Meyer, George A. Pope and H. P. Veeder.

On January 26, the first message was sent from the new naval radio station at Chollas Heights, San Diego, to the Arlington station, near Washington, D. C., thus marking the completion of the most powerful radio station on the Western hemisphere.

The radio apparatus at the Chollas Heights station is of the Federal Poulsen arc type, as manufactured by the Federal Telegraph Company of San Francisco. The Poulsen system of radio transmission was invented eleven years ago by Valdemar Poulsen and six years ago the patent rights in the United States and dependencies were secured by the Federal Telegraph Company. At the time this concern took hold of the Poulsen system, the largest arc transmitter built by Poulsen was of five kilowatts capacity. The experimental and development work carried on by the Federal Telegraph Company since that time has made

The great Radio station of the Federal Company at Ko ko head, Honolulu. The masts are 600 feet in height.

possible the high-power transmitter installed at the Chollas Heights station.

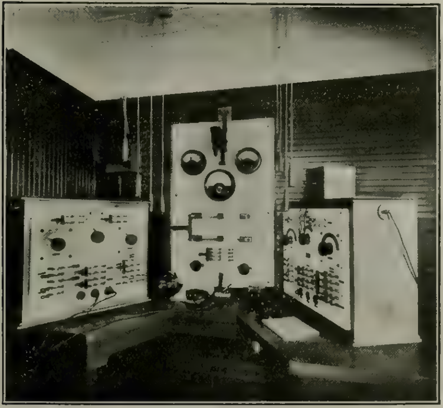
The initial trial of the Chollas Heights station brought together quite a notable gathering of radio experts, among them being Lieutenant S. C. Hooper, Officer in Charge of Radio Telegraphy, Bureau of Steam Engineering, Navy Department, Washington; Dr. L. W. Austin, Head of the United States Naval Radio Telegraphic Library, Bureau of Standards, Washington; Lieutenant Commander Geo. C. Sweet, U. S. N.; Geo. C. Hanscom, Expert Radio Aide, Naval Yard, Mare Island; H. P. Veeder, Vice-President and General Manager, Federal Telegraph Company; L. F. Fuller, Chief Engineer, and H. L. Burross, Superintendent, of the same concern.

Highly interesting as this great radio station is, however, some of the apparatus employed by the Federal Telegraph Company right in and about San Francisco is just as worthy of note.

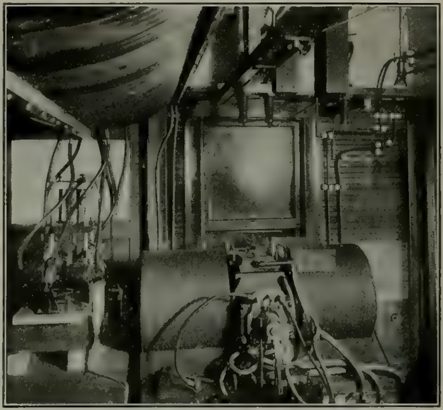
The principal commercial station of the Federal Telegraph Company in California is located in South San Francisco, a short distance south of San Francisco, and comprises one 608 and one 440-foot mast and is equipped with a 50-kilowatt arc. Service between San Francisco and the southern stations is maintained by a station on the ocean beach a short distance south of the Golden Gate.

About fifteen months ago, the Federal Telegraph Company opened commodious offices on the main floor and the eighth floor of the Hobart Building, San Francisco, moving from their old quarters in the Merchants Exchange Building.

The great improvements in wireless apparatus that had just been perfected at that time were taken full advantage of in fitting out the new wireless offices. From an antenna strung from the top of the Hobart Building to the Flat Iron Building, messages are received by operators in the Hobart Building. These messages are copied on typewriters and are ready for immediate delivery.



Operating room of Radio station at South San Francisco, California.



Apparatus room of Radio station at South San Francisco, California.

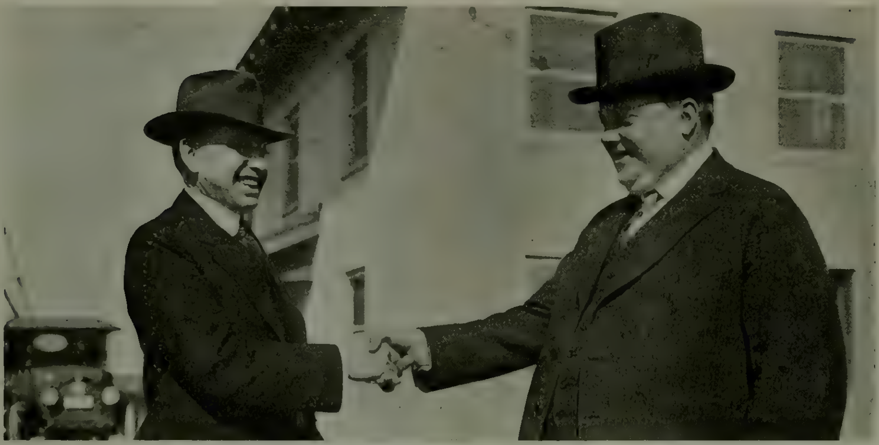
Other operators are sending messages through the powerful station on the ocean beach and these messages are received at the down-town Los Angeles office of the company, thereby furnishing a service that is as rapid as is physically possible. It is possible to send two messages from the Hobart Building through the South San Francico station simultaneously, one going directly to Honolulu and the other to Portland. At Portland an antenna has been erected on the roof of the Board of Trade Building, which, together with the station located at Lents, Ore., gives a complete radio duplex service between San Francisco and Portland, the same as has been in operation for nearly two years between San Francisco and Los Angeles.

The development of the Federal Telegraph Company's apparatus was brought about through following the great advance in the science of radio telegraphy, wrought by the discovery of a method of developing undamped or continuous Hertzian waves as distinguished from damped waves that had previously been used by all spark systems. Waves radiated continuously from the sending station, and each wave as strong as its neighbor, are known technically as undamped waves, and are thus distinguished from the damped wave system, wherein the current radiated from the sending station is not sent continuously but in groups, no two adjacent waves having the same strength.

The reason why radio-telegraphists the world over have striven to obtain undamped, continuous oscillations are: First: Decreased absorption due to daylight. This means that with the undamped wave much less power is required than with the damped wave.

Second: Much sharper tuning is possible and therefore systems employing such waves are less troubled by interference from other stations, as well as by atmospheric disturbances.

Every conductor, such as an antenna circuit, has a natural period of electrical vibration. Just as a



Lieutenant Commander George Sweet, U. S. N., congratulating Mr. H. R. Veeder, Vice-President and General Manager of the Federal Company on the successful opening of the Chollass Heights Radio station.

piano string answers to its own note and no other, just so a receiving antenna is tuned to respond to the same wave length as the sending antenna and is but slightly affected by waves with which it is not in resonance. It is this "tuning" that prevents interference between stations.

The Poulsen arc system has been developed to the point where wave lengths varying from 300 to 20,000 meters can be used and the receiving apparatus has been refined to such an extent that when "tuned" to receive a signal of a certain wave length it will not receive one whose wave length varies more than three per cent from that for which it is tuned. For instance, if tuned for a wave length of 5,000 meters it would not receive, without adjustments, signals with wave lengths of less than 4,850 or more than 5,150 meters. The success of the Poulsen apparatus, its wide range on comparatively low power and its reliability has caused it to be adopted by the Navy, which now has stations at Tuckerton, Arlington, the Isthmus of Panama and at San Diego. The vessels of the new Navy are also equipped with Poulsen sets of the latest design.

The Federal Telegraph Company apparatus has the advantage of having no moving parts, bearings or small air-gaps; and no fine mechanical work is necessary in its manufacture. It is in effect a stationary transformer and the wave-length may be changed instantly. A direct-current electric arc is maintained between copper-carbon electrodes within a closed, water-jacketed chamber containing hydrogen or a volatile compound with a large hydrogen component. Across this arc is placed a strong magnetic field. If the terminals of such an arc be connected, one to the antenna and one to the earth, energy from the arc will be taken up by the antenna in the form of alternating pulsations of current. This energy is then radiated by the antenna as electro-magnetic waves. The frequency of the wave length radiated is determined by the electrical characteristics of the antenna circuit and these are adjusted to produce the desired wave length. The signals are made by a relay key, which switches the current from the antenna, or radiating circuit, to a local non-radiating circuit. The relay is operated by an ordinary Morse telegraph key.

If we place an elevated conductor, or antenna, in the path of the moving electro-magnetic waves, we have an alternating current set up in it, which may be detected by the use of suitable apparatus. The current induced in the receiving antenna has a frequency above the limits of audibility by the human ear. This current is rectified into direct current by one of the many methods in use, and can then operate a telephone receiver. The signals are usually heard as a musical note or whistle, making the ordinary dots and dashes of the Continental alphabet.

Arcs of still larger capacity for the United States Naval Stations are now being manufactured by the Federal Telegraph Company for Honolulu and Manila. The exact range of this huge apparatus, which is rated at 350 kilowatts, is not known, but the 50-kilowatt station at San Francisco is receiving regularly and commercially from vessels fitted with radio at well over 5,000 miles. The Honolulu station has copied messages from Eilvese, Germany, and the steamship "Ventura," of the Oceanic Steamship Company fleet, while in Sydney, Australia, has copied messages sent from the Tuckerton, New Jersey station, using a Federal Poulsen arc of approximately the same power as that of South San Francisco, a distance of over 10,000 miles. The Naval station at Chollas Heights, San Diego, as stated before, virtually encircles the world, as its range has proven to be equal to over

Mr. H. L. Burross, Superintendent of the Federal Company, whose headquarters are in San Francisco.

have the circumference of the globe. In view of these remarkable results, it will be highly interesting to learn of the capabilities of the great stations being erected by the Government in Honolulu and Manila.

SOUTHWARK-HARRIS ENGINE ON EXHIBITION

The first of the new Southwark-Harris Valveless Oil Engines to be received in San Francisco was unloaded at the factory of the Standard Gas Engine Company, exclusive agents for Pacific waters for this engine, last week. It was placed on exhibition at the East Oakland shops, and has attracted a great deal of attention among marine men.

The engine is a four-cylinder type, developing 150 brake horse-power, and is the right-hand engine for a twin installation, the left-hand engine for which will be shipped from the factory in May.

This first engine was sent out early in order to have one in exhibition in San Francisco, and let those interested in marine motors in this port view it.

The engine is one of the finest examples of constructive marine engine work ever brought to the coast. It is a valveless engine, operating on the step-piston, two-cycle principle, the scavenging piston being also an air piston for starting and reversing.

By utilizing this method, the great drawback of the ordinary Diesel type engine, that of admitting ice cold air under high pressure into the hot working cylinders, which is the cause of most Diesel troubles, is done away with.

By actual demonstration it has been proved that the Southwark-Harris engine will start from stone cold to full power in ten seconds, and will reverse from full ahead to full astern in five seconds, giving this power plant all the flexibility of steam.

Several Southwark-Harris Diesel installations are under way on the Pacific Coast. The San Juan Packing Co. is installing a 225 brake horse-power, six-cylinder outfit in a big halibut boat at Seattle, while the King County Commissioners have an engine of the same type under installation in a ferry boat to operate to Vashon Island.

The Alaska-Pacific Navigation Co. is installing twin 400 brake horse-power, four-cylinder engines in the big motorship "Oregon." The engines will be shipped in April and May. Two pair of 400 horse-power Diesels also are under construction for the Crowley Launch and Tugboat Co., and will be installed in the two big motorships Crowley will use for the South American trade.

Several ship owners have entered into negotiations for the twin 150 horse-power engines, and are planning on using them in either full powered or auxiliary motorships. Another pair of twin engines is being offered by the Standard Gas Engine Co. for shipment August 1st. The first of these two engines has just come off the test stand and will be shipped at once to Oakland, while the construction of the left-hand engine has begun, and will be completed in July.

West coast shipping men are rapidly realizing the advantage of the Diesel installation, not only from the decreased fuel cost, but the increased carrying capacity, as it does away with all boilers, etc., and is much lighter and requires much less space than a steam installation of the same power.

TO MOVE LIGHTSHIP

On or about May 1, 1917, the Columbia River light vessel will be moved to a point about one and one-eighth miles 180 degrees true from its present position, or to latitude 46 degrees, 10 minutes and 45 seconds north and longitude 124 degrees, 10 minutes and 35 seconds west, and moored in 35 fathoms of water on the Main Channel Range Line.

NEVASPLIT ON "MAUI"

The interior of the fine new Matson Navigation Company's liner "Maui," which is booked to leave for Honolulu on her maiden voyage during the present month, is a splendid example of what may be accomplished with "Nevasplit" panelling. This material has been used lavishly in the ceiling work on corridors and in the public rooms with uniformly pleasing and satisfactory results.

The Motorship "Sierra" coming in through the Golden Gate. The steam seen is from the winches being warmed up, the Sierra working her deck machinery with steam supplied by an oil fired donkey boiler.

CURES FOR SUBMARINES

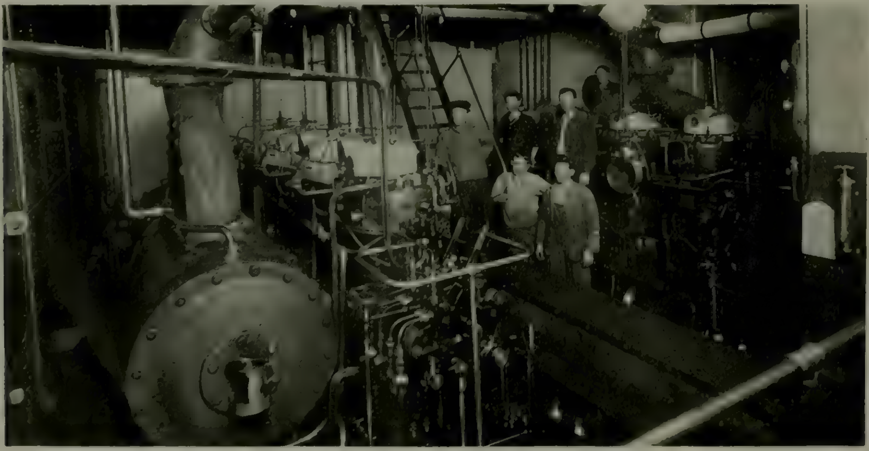
Representative Husted of New York introduced a bill into Congress on March 1st offering a prize of $500,000 to any corporation or individual who could devise any plan or invent any mechanism that would eliminate the effectiveness of the submarine. The means of combatting the effectiveness of the submarine, both offensive and defensive, must have received a great deal of consideration during the past two years. There is evidence that the means of combatting the submarine have advanced a little more rapidly during the past year than the effectiveness of this modern instrument of destruction. Certainly any man or firm who could produce a system, device or plan whereby the depredations of underwater craft could be materially diminished will have amply earned a $500,000 reward. The cost of one small ship would be a low price for a real preventative that produced results.

Should any person, however, come forward with a device that held real promise of overcoming the effectiveness of the submarine as an engine of destruction, we doubt if the Government would have time to present him with a half million. Private shipowners would probably have the lucky individual so well furnished with this world's goods that Congress might hesitate about fattening his bank roll any further.

BIG BONDING CONCERN ENTERS COAST FIELD

W. H. Gerhauser and Company of Detroit, Michigan, who are recognized as being among the leading specialists on steamship financing on the Great Lakes, have entered the Pacific Coast field with offers to finance bond issues on freight steamers building for the coast-wise trade.

This firm is identified with several of the largest shipbuilding interests on the Great Lakes and is well qualified to take care of large financing. During the past year, Gerhauser and Company have handled several large issues and are seeking to broaden their activities on both the Atlantic and Pacific Coasts.



Engine room of the motorship "Sierra," showing her twin 320 B.H.P. Bolinder engines.

PERSONALS

Captain Frederick Rouse, a former resident of San Francisco and well known up and down the Pacific Coast, and patentee of the well-known Rouse sea anchors, is again in New York. The popular Captain is often mentioned in Eastern shipping magazines, his last berth being to deliver the former Clyde line steamer Eaglet to her new Burmudan owners.

Mr. Paul P. Whitham, a well-known consulting engineer of Seattle, who has specialized on harbor and terminal engineering, is shortly to sail for Vladivostok. Mr. Whitham has been appointed Federal Trade Commissioner to Russia and will spend two years studying trade opportunities and transportation facilities in the Far East.

Mr. Harry M. Pitman, a San Francisco contractor, was the lowest bidder on the salving of the cruiser Milwaukee. Pitman's bid is $400,000.

Mr. J. J. Farrell, junior partner of Norton, Lilly and Company of New York and a son of Mr. J. A. Farrell, president of the U. S. Steel Corporation, spent the early part of March in San Francisco looking after the opening of a branch office of his firm.

The first of last month witnessed the passing of one of the oldest shipping and commission houses in San Francisco, the firm of Girvin and Eyre. Richard D. Girvin has retired and the old firm name is now the Edward L. Eyre Company.

The steamer "Minnesota" in Hunter's Point dry dock being coated with composition furnished by the American Marine Paint Company of San Francisco.

Mr. Tomlinson, newly appointed manager of the marine department of C. B. Sloan and Company.

C. B. SLOAN AND COMPANY

The entrance of C. B. Sloan and Company in the average adjusting field marks the appearance of another strong firm in this line operating on the Coast with San Francisco as headquarters. The President of C. B. Sloan and Company is Mr. A. D. Harrison, who for many years was with Catton, Bell and Company; John E. Cosgrove, the vice president, was formerly assistant manager of the Union Assurance Society, later Superintendent of Agencies for the Commercial Union and then Assistant Secretary of the California Insurance Company. Mr. J. B. Reader, who occupies the post of Secretary, has been connected with the liability and casualty business for many years.

Mr. Tomlinson, the manager of the marine department, needs no introduction to the Pacific Coast marine insurance circles. It is nearly twenty-five years since Mr. Tomlinson entered the Canton Insurance office. Later he was with McCondray and Company. He left this well-known firm to enter the employ of Balfour, Guthrie and Company, with whom he remained for ten years. After spending four years in Seattle, Mr. Tomlinson joined the forces of Johnson and Higgins and still later was with the adjusting department of Wilcox, Peck and Hughes. Mr. Tomlinson has had a wealth of experience, both in the adjusting and brokerage fields, and with the strong personnel of C. B. Sloan and Company to back up his efforts, there is little doubt that the latest firm to enter the marine adjusting field will quickly make a record for itself in marine adjusting.

Personal and Otherwise

DURING the latter part of February, San Francisco lost one of its most popular steamship men through the transfer of Mr. C. Lacy Goodrich to Manila, where he will fill the important post of General Agent for the Toyo Kisen Kaisha. Mr. Goodrich first went to sea in 1889 as a storekeeper on the S. S. "Belgic" of the White Star Company, which, together with the "Oceanic" and "Gaelic," were under charter to the Occidental and Oriental Steamship Co. The "Oceanic" was later retired and succeeded by the "Coptic." At this time there were but nine ships engaged in the trans-Pacific trade, besides those mentioned the Pacific Mail Steamship Company operating the "City of Peking," the "City of Sydney" and the "Rio de Janeiro" and the Canadian Pacific running out of Vancouver the "Absyssina," "Parthia" and Batavia."

Mr. Goodrich was with the White Star from 1889 to 1901, becoming purser of the "Coptic" in 1895 and remaining with this ship till 1901. Owing to the retirement of the White Star ships from the Pacific, he then went to the Toyo Kisen Kaisha as purser of the "Nippon Maru," and after serving successively on the "America Maru" (during the Russo-Japan war) and the "Tenyo Maru" for three years following her launching in 1898, he went to the Orient in June, 1911, as General Oriental Agent for the Western Pacific Railroad, which was affiliated with the Toyo Kisen Kaisha in a traffic agreement. Mr. Goodrich's territory embraced Japan, Siberia, China, Strait Settlements, India, Ceylon, Java and the Philippines, and he was kept travelling for eight months in the year.

Just prior to the outbreak of the present European war in August, 1914, the Western Pacific Railroad underwent entire reorganization and abolished its Oriental Agency and Mr. Goodrich returned to San Francisco, and, after a well-earned rest, he was returned to the Far East as Oriental Traffic Agent of the Toyo Kisen Kaisha with the same territory to cover as previously. Owing to the continuance of the European conflict, which to a very considerable extent hampered his travelling representation, Mr. Goodrich was returned to San Francisco in the fall of 1915 and appointed General Passenger Agent of the Toyo Kisen Kaisha at this port. In February of this year, however, he was promoted to the General Agency of the Philippines and left for his new post on February 16, sailing on the "Nippon Maru" and receiving one of the heartiest send-offs witnessed on the waterfront for a long time.

W. B. Fraser of Seattle has become a heavy stockholder and a moving spirit in the Western Shipbuilding Corporation of that city.

Mr. Jack Westrope, one of the best known and liked men in shipping circles and on San Francisco's waterfront, was tendered a dinner by the Merchants Exchange Club on March 16 as a farewell token of the esteem in which his friends hold him. Mr. Westrope left for Europe on March 17 to join the British forces at the front.

Mr. E. W. Wilson, for some time acting Consul for Chile at San Francisco, has entered the employ of Comyn, Mackall and Company, and will have charge of their West Coast business.

Mr. Clifton H. Kroll, of the firm of Atkins, Kroll and Company, returned to San Francisco on March 16 from a six months' tour of the Orient, where he visited the Philippines, Guam and other copra centers. Mr. Kroll was much impressed with the shipbuilding activities of Japan.

Mr. William H. Barnum and Mr. Walter Barnum, President and Treasurer, respectively, of the Pacific Coast Company, spent the latter part of March in Seattle. The final disposition of the steamer "Congress" is one of the important matters that demanded the presence of officials of the holding company of this vessel and a large part of the Pacific Steamship Company's fleet.

BE CAREFUL OF YOUR DECKS

You can scrape your decks down to the wood, sandpaper them down to a glass finish, and then rub down between each coat of varnish that you put on, and flatter yourself that you made a good job of it.

And then, the first thing you know, along comes a hot, dry spell, the strips of the deck shrink, and the composition of putty, wood filler, and various other things that are so often used to fill in places between the strips, cracks and loosens.

Then the next time the deck gets wet, the strips swell and squeeze out the loosened putty, and all your toil has been for naught as far as the appearance of that deck is concerned.

There has, to date, been discovered just one composition that will stay in the deck seams for an entire season, no matter to what degree of alternate wetness and dryness, cold and heat, the decks are subjected, and this composition is JEFFERY'S PATENT MARINE YACHT GLUE, and the secret of the longevity of its usefulness lies in its elasticity, which allows it to be compressed or expanded without leaving the sides of the seam in which it is placed.

Send for booklet—See page 3. Illustration A shows what happens to a seam under a hot summer's sun. B shows what happens when the deck gets wet, and the black substance in the seam is JEFFERY'S MARINE YACHT GLUE, which, as the illustration shows, sticks to the edges of the seams and also to business during the entire performance.

The glue is made in black, white, yellow and also a mahogany color. White, Yellow and Mahogany look pretty, but the Black is the best and is guaranteed by the makers to be the really genuine original sticker that relieves the owner's mind of all care as far as his seams are concerned. It is a mighty good idea for the boat owner when specifying work to be done in his boat when getting her in commission for next year to specify that Jeffery's Marine Yacht Glue be used to pay the deck seams, or, if he intends doing it himself, to write to L. W. Ferdinand & Co., 152 Kneeland St., Boston, Mass., for a sample of the glue and directions for applying same. These directions are a mighty important item, as, while very simple and easily followed, they must be followed if the best results are to be obtained.

Insist on having JEFFERY'S Marine Glue. In all the various grades it is the best for the money—the most serviceable. Pound for pound, it will go further and do a better and more lasting job than any other make. Do not be deceived by cheap imitations. See that the trade-mark is on every package.

PAUL JONES OR THE STATELY SOUTHERNER

It's of a stately Southerner
That flew the stripes and stars,
While a spanking wind from the west-nor-west
Blew through her pitch-pine spars.
With all our larboard tacks on board
We raced before the gale,
On an Autumn night we raised the light
At the old Head of Kincale.

The night was bright and cloudless,
The wind blew steady and strong
As gaily over the bounding deep
Our good ship bowled along.
With the foaming seas beneath her bows
Those fiery waves she spread,
While bending low her bosom of snow
She buried her lee cat-head.

There was no word of short'ning sail
From him who trod the poop,
Tho' by the weight of her ponderous jib
Her boom bent like a hoop;
Her groaning chest-tree told the strain,
It held her stout main-tack,
But he only laughed as he glanced abaft
At her bright and foaming track.

Where the ebb-tide meets the Channel sweep,
That flows from shore to shore,
The mist hung heavy upon the land
From Featherstone to Dunmore,
And tho' the mists of morning gray
Hung heavy on our lee,
The look-out man at the masthead cried,
"A strange sail, Sir, I see."

What ship is that on our starboard bow,
What, that hangs on the breeze?
It's time our good ship hauled her wind
Abreast of the old Saltees,
For by her crowding press of sail,
And by her consorts four,
We knew our morning visitor was
A British Man-o-war.

Out spoke our gallant Captain
As a shot ahead of us passed,
"Haul snug your flowing courses,
Lay your top's'ls to the mast."
The Englishmen gave three hearty cheers
As they saw us hauled aback,
But we tried their pride with a solid broadside
From the deck of our saucy bark.

Lighter built for the Oakland Launch and Tug Boat Company at the yards of Wm. Brusstar, Jr., Oakland, California.

Now tho' we'd rather fight than run,
We dared not risk defeat
Before the guns of that three-decked ark
That led the British fleet.
She came rolling down on our weather beam
With the white foam at her bow,
Out booms on board the Southerner
Spare not the canvas now.

The nightly robes our good ship wore
Were her whole tops'ls three,
Her spanker and her standing jib,
Her courses being free.
Now at the word we raced aloft
And off the gaskets cast
And royals and top-gallant sails
Were quickly on each mast.

"Out booms—Out booms," our Captain cried;
"Out booms and give 'er sheet,"
And the swiftest keel that ere was launched
Shot ahead of the British fleet.
And amid the thundering shot and shell
With stun-s'ls hoisting away,
Down the North Channel Paul Jones did steer
Just at the break of day.

The foregoing verses are supposed to refer to Paul Jones' cruise in the "Ranger" in 1777, although the incident which gives that famous sea fighter credit for such an unusual degree of caution is unmentioned by his biographers. But then biographers are like tombstones in that respect. Whether the unknown author is historically correct or not, he has given us a rattling sea song, the first three verses being particularly good. The reason for referring to the "Southerner" is obscure, but the "Ranger" may have been built at Baltimore, that southern port being famous at an early period for its fast ships.

BUSINESS ANNOUNCEMENTS

The De Laval Steam Turbine Company of Trenton, New Jersey, manufacturers of steam turbines and helical reduction gears for all classes of service, including ship propulsion and marine work, centrifugal pumps, centrifugal compressors and similar apparatus, announce the opening of a district sales office in the L. C. Smith Building, Seattle, Washington, in charge of Mr. William Pullen.

A. O. Andersen and Company are opening a branch office in San Francisco. A. B. Moulder, formerly connected with A. B. Moulder and Company of Hong Kong, will be in charge.

SHIPPING MEN VISIT MOTORSHIP

(Contributed)

A party of representatives of shipowners paid an interesting visit to the 7,200-ton Diesel driven motorship "Sebastian" during her fifth visit to New York since she was converted and again placed in service last June. These gentlemen included: Mr. W. T. Webster and Mr. Kennedy of the Mallory Steamship and Clyde Lines; Mr. D. Mathieson of W. R. Grace and Company; Mr. Carnegie of the International Mercantile Marine Corporation; Mr. Fox of the Munson Steamship Line; Mr. B. Mills of the American-Hawaiian Steamship Company; Mr. Brown of the Clinchfield Navigation Company; Mr. Julius Kuttner, Mr. E. Sadtler of the American International Corporation; Mr. C. Bowers, Mr. Wallace Downey; Mr. Phillips of the Kennedy Repair Company, and Mr. T. Orchard Lisle, American representative of the Werkspoor engine of Amsterdam.

The "Sebastian" has now run 35,000 nautical miles since June last, and has given absolute reliability, consequently all the visitors were strongly impressed with what they saw. In fact, one of these gentlemen freely announced that he was perfectly satisfied as to the reliability question, and that the operation of the "Sebastian" certainly had converted him from steam to motor and that he will strongly recommend building a motorship to his directors.

Chief Engineer Cole was very frank and conscientious in his statements, and gave some very valuable and interesting information, one fact being that in eight months the main bearings only wore down one hundred and twenty-eighth part of an inch (1/128"), or less than is usual with the bearings of an average steam engine of the same power, namely 2200 i.h.p. Furthermore, he settled the much-discussed exhaust-valve question, by mentioning that he ran for three trans-Atlantic round voyages without having to grind in the exhaust valves. This, however, is a little too lengthy an interval, and now he grinds in the valves every voyage and a half, the grinding being done on a spare set when the ship is at sea, and then changed when in port.

Chief Engineer Cole further states that he would much prefer to be aboard a motorship in heavy weather than aboard a steamer, and that he would not like to go back to steam engines again. He has had active experiences with nearly all the leading European two and four-cycle type marine Diesel engines, as well as steam engines, and, according to him, none can compare with the Werkspoor engines that he now has charge of, both for reliability and accessibility; also for ease of operation. One thing over which there is no doubt, and that is she is **doing the work** economically and reliably.

PORTABLE ELECTRIC TOOLS

The Independent Pneumatic Tool Company, Thor Building, Chicago, have ready for distribution a new circular "Y," a four-page folder, illustrating and describing in detail the Thor line of portable electric drills and grinders.

The Thor line of electric tools consists of eight different sizes of electric drills with capacities ranging from ¼ inch to 2 inches and a portable electric grinder with wheel ¾ by 4 inches.

Thor electric tools are equipped with a Universal motor (licensed under the Burke Universal Motor patent) for operating on alternating or direct current, 110 or 220 volts. They are made with an aluminum cylinder, insuring extreme lightness, and have both ball and roller bearings and a specially constructed powerful motor, resulting in increased capacity. These electric tools are becoming very popular of late on account of the ease with which they may be carried from one job to another and their adapability to various classes of work, all of which is described in the folder mentioned above.

LIST OF MERCHANT VESSELS OF UNITED STATES

The forty-eighth annual list of the merchant vessels of the United States, with their official numbers and signal letters, together with lists of vessels belonging to the United States Government and their distinguishing signals, has been issued by the Bureau of Navigation, with the records brought up to the close of the fiscal year 1916. It is a bound volume of 484 pages, and the various divisions are as follows: Sailing vessels alphabetically arranged; steam vessels similarly arranged; motor vessels; unrigged vessels; index to compound names; loss of American ships and list of vessels of the United States measured under Panama Canal rules; Government ships; names of vessels changed from July 1 to November 30, 1916; official numbers awarded from July 1 to December 31, 1916; American ships of 100 gross tons and over reported as sold to aliens, July 1 to December 31, 1916.

Under the section relating to Government vessels are the following subdivisions: United States Navy; United States Army (including list for Quartermaster Corps, Engineer Corps, and Ordnance Department); Treasury Department (including lists for Coast Guard and Public Health Service); Department of Commerce (including lists for Bureau of Lighthouses, Coast and Geodetic Survey, Bureau of Fisheries, and Bureau of Navigation); Department of Labor (Bureau of Immigration); Interior Department (Reclamation Service, and Panama Canal or Panama Railroad Company.

The information relating to merchant vessels includes official number, signal letters, rig, name, tonnage, register dimensions, service (of steam and motor vessels), crew, indicated horsepower year and place of building, and home port.

Copies of this publication may be obtained at 75 cents each from the Superintendent of Documents, Government Printing Office, Washington, D. C.

SEATTLE'S WONDERFUL YEAR

The Port Warden's annual report for Seattle for the calendar year 1916 shows a splendid year for the big Northwestern seaport and a remarkable growth both in imports and exports over the preceding year. The totals are as follows:

Domestic imports for 1916	$98,229,317
Domestic imports for 1915	77,971,684
Gain in domestic imports for 1916	20,257,633
Domestic exports for 1916	56,763,599
Domestic exports for 1915	56,974,456
Loss in domestic exports for 1916	210,857
Domestic imports and exports for 1916	154,992,916
Domestic imports and exports for 1915	134,946,140
Gain in domestic imports and exports for 1916	20,046,776
Foreign imports for 1916	161,329,789
Foreign imports for 1915	85,289,629
Gain in foreign imports for 1916	76,040,160
Foreign exports for 1916	96,115,614
Foreign exports for 1915	37,556,624
Gain in foreign exports for 1916	58,558,990
Foreign imports and exports for 1916	257,445,403
Foreign imports and exports for 1915	122,846,253
Gain in foreign imports and exports for 1916	134,599,150
Total imports for 1916	259,559,106
Total imports for 1915	163,261,313
Gain in imports for 1916	96,297,793
Total exports for 1916	152,879,213
Total exports for 1915	94,531,080
Gain in exports for 1916	58,348,133
Total imports and exports for 1916	412,438,319
Total imports and exports for 1915	257,792,393
Gain in imports and exports for 1916	154,645,926

NEW PUBLICATION

A definite expression of the conviction among leaders in American business that the new interest of the country in foreign trade has come to stay and with it the retention of an important share of the trade increase gained since the beginning of the war, is given in the new plan of the American Asiatic Association for largely increasing its activity as a trade developer with the Far East by the publication of a new magazine, devoted exclusively to the Orient and our relations with it, to be called "Asia."

A group of leaders in the association, which has numbered in its membership since its establishment in 1898 most of the prominent large traders with China and Japan, including Eugene P. Thomas, president of the United States Steel Products Company, the export end of

JOHNSON & HIGGINS

INSURANCE EXCHANGE BUILDING
SAN FRANCISCO

INSURANCE BROKERS AND AVERAGE ADJUSTERS

the Steel Corporation business; Willard Straight, vice-president of the American International Corporation; Lloyd Griscom, formerly United States Minister to Japan, the president of the association; Robert H. Patchin, secretary of the National Foreign Trade Council; Martin Egan, formerly editor of the Manila Times; John Foord of the Journal of Commerce, secretary of the association, are directly back of the new magazine. Charles M. Schwab, Chairman of the Bethlehem Steel Corporation; Alba B. Johnson, president of the Baldwin Locomotive Works, as vice-president of the association; James R. Morse, president of the American Trading Company; H. T. S. Green, president of the International Banking Corporation; Maurice A. Oudin, foreign manager of the General Electric Company, and representatives of the Standard Oil Company, the British-American Tobacco Company, and other large concerns in the Far Eastern trade, as members of the Executive Committee, are among the active supporters of this new move for the development of American prestige and business in the Far East.

The new magazine, which is illustrated, is to be run along much broader lines than a trade paper, the effort of these leaders in American business being chiefly one of conveying through the publication a fundamental interpretation of the life and spirit of China, Japan and the other great Oriental countries, in terms of their industrial progress. It is believed that American opportunity can best be presented in this way. The growing complication of the political relations of the powers in the Far East, particularly those developing out of the problem of Japan and China, with which this country must be concerned, has made it essential in the opinion of these leaders in American business, that the United States should more definitely realize its responsibilities, as well as its possibilities as an intermediary, as a friend of both China and Japan, in the insurance of settlement of dissensions and maintenance of peace in the solution of the Oriental problem.

The new magazine will conduct a series of articles on special features of the industrial development of the East, including railway building in China, where American capital and engineering ability have just started on a campaign for a large active share of the future expansion of China's railroad facilities, elements in the prosperity of Japan and the new developments of big American trade with the East.

Richard Washburn Child, who last year conducted a study of the industrial possibilities of Russia for prominent American magazines, has already left for the Far East to represent "Asia" in a study of the same questions in China, Japan and the Philippines.

LARGE HOIST FOR JAPAN

The Nordberg Manufacturing Company of Milwaukee, Wisconsin, recently shipped through Mitsui and Company, a large electric hoist for installation at the Ashio copper mines of Furukawa and Company, Tokyo, Japan. Furukawa & Company is the largest mining concern in Japan and, according to a recent statement, has an annual production of 38,000 tons of copper, 200,000 tons of copper ore, 1,500 tons of sulphate of copper, 18,000 tons of bare copper wire and 3,000,000 tons of coal.

The Ashio mines, at which the new hoist is to be installed, are the largest copper-producing group owned by the company. The design of the hoist is in general very similar to many other electric hoists built by the Nordberg Manufacturing Company for installation in Japan. The drums are 10 feet in diameter and for 1800 feet hoist. The drive is by motor through cut herringbone gears, power being supplied from a near-by hydro-electric plant.

HOLDS SALES CONVENTION

The Independent Pneumatic Tool Company, general offices, Thor building, 1307 South Michigan avenue, Chicago, held their annual sales convention on Wednesday, February 28th, and Thursday, March 1st, 1917. The following named gentlemen attended: Messrs. John D. Hurley, Fletcher W. Buchanan, Ralph S. Cooper, R. T. Scott, W. H. Rosevear, George C. Wilson, Van W. Robinson, Vernon Job, H. F. Finney, W. A. Nugent, S. W. Lanham, H. F. White, G. H. DuSell, H. H. Hendricks, Frank F. Leavenworth, A. Levedahl, R. A. Norling, F. B. Hamerly, Ivar Hanssen, A. J. Keeley, Paul Weis, Fred Beasley, C. A. Brose, Frank J. Hurley, H. G. Keller, W. R. Gummere, J. R. Hague, F. P. Bertrand, J. E. Barber.

The first day's meeting was held at the company's factory, State and Claim streets, Aurora, Illinois. Here the representatives were taken through the different mechanical departments, reviewing in detail the construction of Thor tools. New mechanical ideas were taken up, the most important being the line of Thor air drills, which the company is bringing out equipped with Vanadium pressed steel toggles. This is the very latest in air drill construction.

The second day's meeting was held in the New Southern Hotel, 13th Street and Michigan Avenue, Chicago, Illinois. This meeting was a general sales meeting, the object being to get the representatives together and discuss various ways and means for increasing the business and to give Thor users better service. Many new ideas were brought out at this sales convention and the men were unanimous in declaring it a huge success.

The various representatives left for their respective branch offices and territories Saturday, March 3rd, 1917.

HARDWOOD PRICES

White Brothers, the leading hardwood dealers on the Pacific Coast, in their latest price lists, give the average (dry) weights per 1000 feet of different hardwoods and other useful information. This concern, which carries the widest range in hardwoods to be found on the Pacific Coast, besides keeping native California woods in stock, draws upon the Mississippi Valley and the country around the Great Lakes for ash, oak, hickory, maple and gum; from Turkey for boxwood and Circassian walnut, from the Fiji Islands for dumanu and yaca, from Madagascar for ebony, from Central America and Mexico for genezero, mahogany, Spanish cedar, lignum vitae and primavera, from Australia for ironbark.

WHITE BROTHERS
HARDWOOD
LUMBER
TIMBER
FLOORING
VENEERS
PANELS

INDIANA BENDING OAK-TEAK-ASH
WHITE CEDAR-IRON BARK-MAHOGANY
– – – LONG OAK KEELS – – –
EASTERN WHITE AND RED OAK, ETC.
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THE LARGEST STOCK OF HARDWOODS IN THE WEST

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Wooden Commercial Vessels

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SERVICE

THAT ABILITY TO GIVE UNINTERRUPTED SATISFACTION YEAR AFTER YEAR, IS THE KEYNOTE OF

FRISCO STANDARD

SUCCESS.

THE FIRST FRISCO STANDARDS BUILT ARE STILL RUNNING AND DOING THE WORK THEY DID 16 YEARS AGO.

STANDARD GAS ENGINE CO.

MAIN OFFICE AND WORKS, EAST OAKLAND

Van Arsdale-Harris Lumber Company

FIFTH AND BRANNAN STREETS SAN FRANCISCO, CALIFORNIA

White Cedar, Spruce or Sugar Pine Template Lumber

Worked to Any Thickness Desired

Redwood Pattern Stock

In All Grades and Thicknesses

White Cedar

For Mould Loft Flooring

Long Clear Fir Timbers · Vertical Grain Fir Decking

Sugar Pine · California White Pine

PACIFIC MARINE REVIEW

S. V. HARKNESS READY FOR LAUNCHING AT THE SKINNER & EDDY PLANT, SEATTLE

NORTHWEST SHIPBUILDING NUMBER

MAY - 1917

RED LINE BRAND OILS (AND GREASES)

LUBRICATE

THOROUGHLY ECONOMICALLY

DIESOL — A CLEAN, POWERFUL, ECONOMICAL FUEL FOR INTERNAL COMBUSTION ENGINES

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PACIFIC
MARINE REVIEW
The National Magazine of Shipping

VOL. XIV, No. 5 SAN FRANCISCO MAY, 1917

Shipbuilding in the Northwest

One of the Pioneers

IN these strenuous days when the ravages of war in the commercial fleets of the world have brought about a sudden and vigorous revival in the old-time American industry of wooden shipbuilding and schooners of four and five masts with capacities of from two thousand to four thousand tons, with and without auxiliary power, are being built by dozens up and down our coasts, it may seem strange that we reproduce the picture of a little two-masted, one topmast schooner of only 155 tons, during her lifetime the "Annie Gee" of San Francisco. But it may interest our readers to have presented to their view the type of vessel that used to serve the purposes of the coasting trade on our Pacific shores nearly half a century ago and to those of the older generation it may recall the time when sail predominated over steam in ocean borne commerce, paddles over screw propellers and the speaking trumpet and the semaphore were the only wireless.

From a little fishing village on the shores of Massachusetts Bay there came to the city by the Golden Gate in the fifties, among thousands of others, five brothers, master mechanics, shipwrights and caulkers, and followed their callings in and out of the port of San Francisco. After building several small schooners, among them the "Cohasset," named for their birthplace; the "Cynthia," named for their mother, and the "L. D. Heywood," Isaac and Winslow G. Hall embarked definitely in the shipbuilding business as the firm of Hall Brothers, with offices in San Francisco and building yard in Port Ludlow on Puget Sound.

The first product of their yard, launched forty-three years ago in the month of April, 1874, was the schooner "Annie Gee." There followed next in order the little schooner "Ellen J. McKinnon," whose chief claim to notoriety lies in the fact of her having been the vehicle of the attempted escape from justice of Duncan, a frenzied financier, who may be recalled by old timers. Within less than a year, Hall Brothers associated with them another brother, Henry K. Hall, the better to be able to handle their growing business. The new partner's first work with the firm was on the schooner "Cassie Hayward," built for Captain Hayward, who later became well known as Master of Australian liners out of San Francisco. In 1876 was launched the three-masted schooner "Premier," still sailing the seas for the Alaska Packers Association and the oldest of the Hall fleet remaining and still fit for deep water after more than forty years of service as is witnessed by recent voyages to Japan and the West Coast. In 1876 the barkentine "Quickstep," of something over 400 tons, was built. This was the first vessel turned out by the Hall yard with square yards and was a trim, smart little vessel. Under command of Captain Charles Fake, she made a voyage to Hampton Roads with lumber. Returning to Portland, Oregon, from New York, where she attracted much favorable attention, on one of the packet lines maintained in those days, she beat the ship "St. Mark" to San Francisco, the two vessels starting together.

During the next few years the Hall yard turned out a fleet of sixteen or eighteen vessels for the Hawaiian inter-island trade, about half being small schooners and the rest steamers of varying size

The "Annie Gee," of about 120 tons, launched in April, 1874, the first vessel built by Hall Brothers at Port Ludlow, Washington.

for the passenger and sugar trade and in 1880 the firm closed its yard in Port Ludlow after launching the schooner yacht "Aggie" and the pilot boat "Lady Mine," both well known for many years in their home port of San Francisco and both still afloat, though now put to more degenerate purposes than those for which they were built, the "Aggie" having been sold to Mexican interests for a trader a few years ago and the "Lady Mine," after thirty years of service on the Bar, going to Victoria to engage in the sealing business. The barkentine "Wrestler," now about to be brought out of retirement in Oakland Creek to renew her former activities as a lumber carrier, was the last vessel launched at Port Ludlow by Hall Brothers, taking the water in December, 1880.

The Port Ludlow sawmill having been shut down indefinitely, Hall Brothers removed their business in January, 1881, to Port Blakely, where were built seventy-seven of their fleet of 108 vessels. Hulls had been gradually increasing in size and schooners now had three masts instead of two and in a few years more had so increased that they were given four and five masts in order to reduce the size of the sails for convenience in handling. Several vessels well known in San Francisco were launched from the Port Blakely yard. The bark "Hesper" attained unenviable notoriety for the bloody mutiny committed on board of her in the South Seas. The mutiny was put down through the courage of the Captain and his wife and the Mate and the ringleaders were brought to San Francisco in irons, where the penalty of the law was dealt out to them. Blood was not the "Hesper's" only claim to notice, however, for she was a handsome vessel and a fast sailer with many good passages to her credit, as Captain Cyrus Ryder can testify.

The barkentines "S. N. Castle," "S. G. Wilder" and "Irmgard" and the bark "Albert" were also familiar sights on the San Francisco water front, whence they plied as packets to Honolulu in the days when steamers on that run were few or none. These vessels were favorites with the traveling public on account of their comfortable quarters and smart passages. Only last Summer the "Albert" showed a clean pair of heels to the tug "Tyee," which was chasing her up the Straits of Fuca vainly trying to overhaul her in the hopes the wind would fall.

In 1885 the revenue cutter "Richard Rush" was launched by Hall Brothers. Condemned by the Government after a strenuous career in the Behring Sea and the Arctic, for which she is well known, she is still in active service and visits her old cruising grounds in the more prosaic guise of a trader and fisherman.

As has been noted, the products of the Hall Brothers' yard were not all hard working vessels; one or two of them were yachts,—ladies, if you please, and a couple, the "Lady Mine" and "Bonita," were working ladies, as it were, trim as yachts but useful members of the fleet. The "Bonita" was launched in 1892 and in design and construction received the care that goes into a labor of love. Her short career on the San Francisco Bar was notable even in its close, which was brought about by her being rammed by a whale of the Farallones.

In 1896 the schooner "Inca" was built and was rigged with five masts, being considered too large for four. Under the command of Captain Peter Rasmussen, the "Inca" has made many voyages to Australia and South Africa, as well as to other waters, and has proven herself an able, smart and handy vessel. Two other five-masted schooners were built, the "Henry K. Hall" and the "George E. Billings," with which vessel the business of the firm of Hall Brothers, of whom Henry K. Hall was then the sole surviving partner, was brought to a close in 1903, after thirty years of activity, during which time the "Hall" vessels had become familiar to shipping people from Port Townsend to Port Elizabeth and from Valparaiso to Vladivostok.

Wooden Shipbuilding

(Continued)

By F. A. Ballin

IN MY former articles I endeavored to show historically how the present methods of wooden ship construction had been evolved from certain conditions prevailing half a century and more ago and to point out the futility of applying those ancient methods to modern requirements.

I attempted to show what efforts had been made to overcome some of the weak points of design, inherent in wooden ship construction and lead up to a clear understanding of what a proper design had to avoid and accomplish.

As stated at the beginning, I intended to demonstrate to the interested public that wooden ships can be built to considerable larger dimensions than generally considered possible or practical.

With this aim and purpose I showed that a proper design must solve the question of longitudinal and transverse strength, lightness, durability and tightness, all of which desiderata must be combined in order to re-establish wooden ship construction to favor in competition with modern steel construction.

Taking up these desired qualifications just mentioned and going back about forty years, we find that these same questions were then under discussion. In the year 1879 I saw the royal yacht "Victoria and Albert," built by Cowes in 1847, of which the following mention is made by W. H. White, late chief constructor of the royal navy, in his "Manual of Naval Architecture" (1887).

"Other composite ships have been constructed with the skin planking in two thicknesses, one or both of which had the planks worked diagonally; it was then unnecessary to fit diagonal rider plates to assist the skin against racking strains.

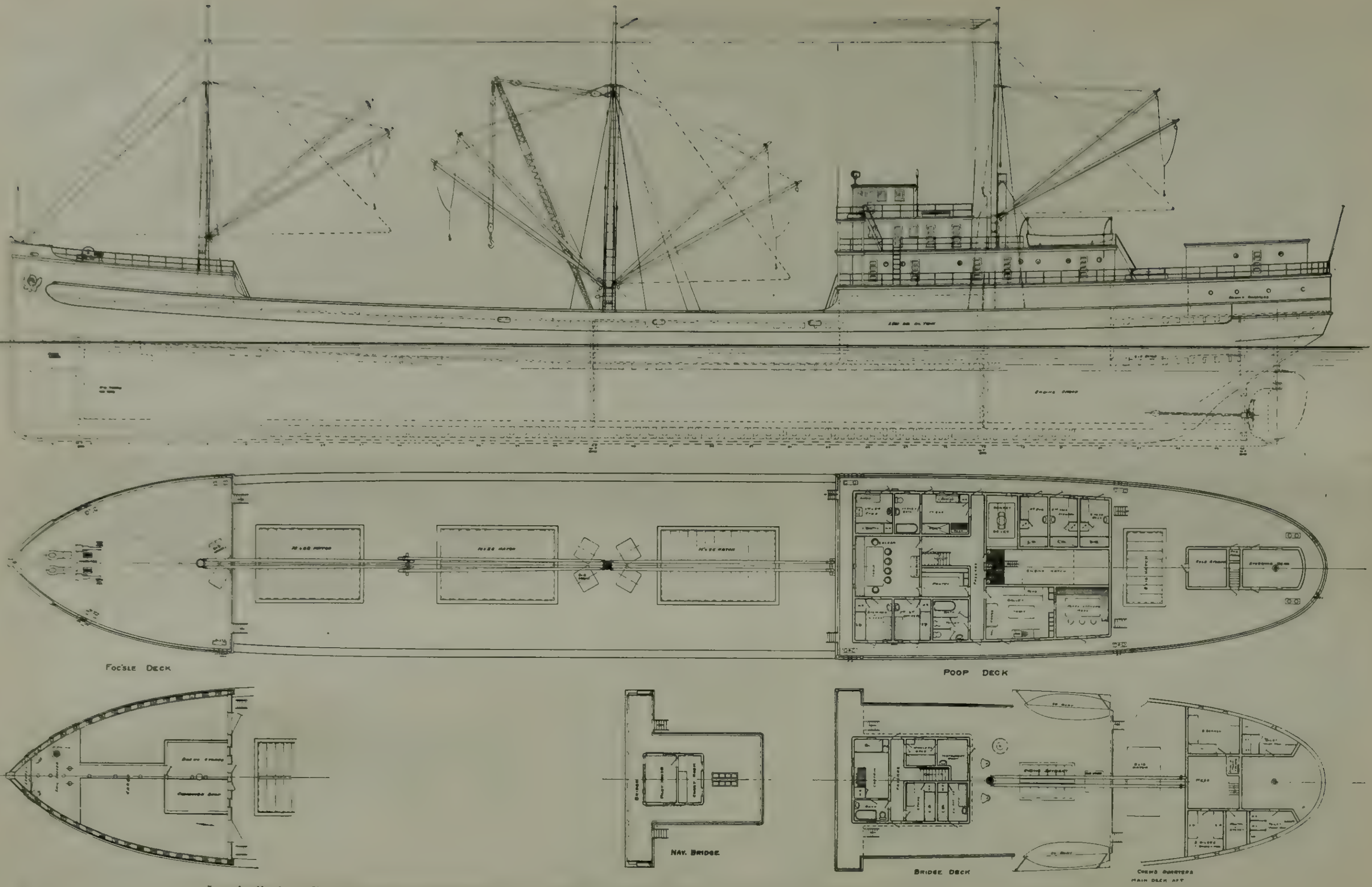
"This diagonal system of planking has also been adopted in some special classes of wood ships with great success.. The royal yachts are examples of this system of construction, and Mr. White, of Cowes, has applied it in many vessels built at his yard. Three thicknesses of planking are employed, the two inside being worked diagonally, and the out one longitudinally. The two diagonal layers are inclined in opposite directions, and the skin thus formed possesses such superior strength to the skin of an ordinary wood ship that there need be comparatively little transverse framing above the bilges. Direct experiments with models, and the experience gained with ships built on this plan, have demonstrated its great superiority in the combination of strength with lightness. The royal yacht Victoria and Albert, built on this plan, with her unusually powerful engines and high speed, is subjected to excessively great sagging moments, but has continued on service for nearly forty years with complete exemption from signs of weakness. Like many other improved systems of construction, this is found rather more expensive than the common plan, but if wood had not been so largely superseded by iron and steel, probably much more extensive use would have been made of the diagonal system."

It will be of interest to state that this vessel was later sold to the Brazilian Government and is today, after seventy years, still in service.

This yacht has a length of 300 feet on the water line but is narrow of beam and of considerable dead rise. She carries, of course, no cargo, but instead heavy armament and large fuel and stores. Our instructor at the naval academy impressed upon us the advantage of the diagonal construction and I have personally followed it, whenever I had a chance, on small and large vessels too numerous to mention. Coming to the Pacific Coast twenty years ago I had the opportunity of applying this system to the 125-foot sea going tug "Samson," now nineteen years old, but still in good condition.

My experience with Douglas fir (Oregon pine) used in this and other vessels built later has been that its greatest enemy to durability is decay. Wood, whether oak or fir, thoroughly impregnated with salt and carbolineum will last almost indefinitely, but along the decks and between wind and water and in the ends of wooden ships it soon shows signs of rotting. As most ships of ordinary construction will work and shrink more or less along the sheer line, in seams, butts and around bulwark stanchions, allowing rain water to penetrate and become foul, rotting is unavoidable.

On the Great Lakes, where I was connected

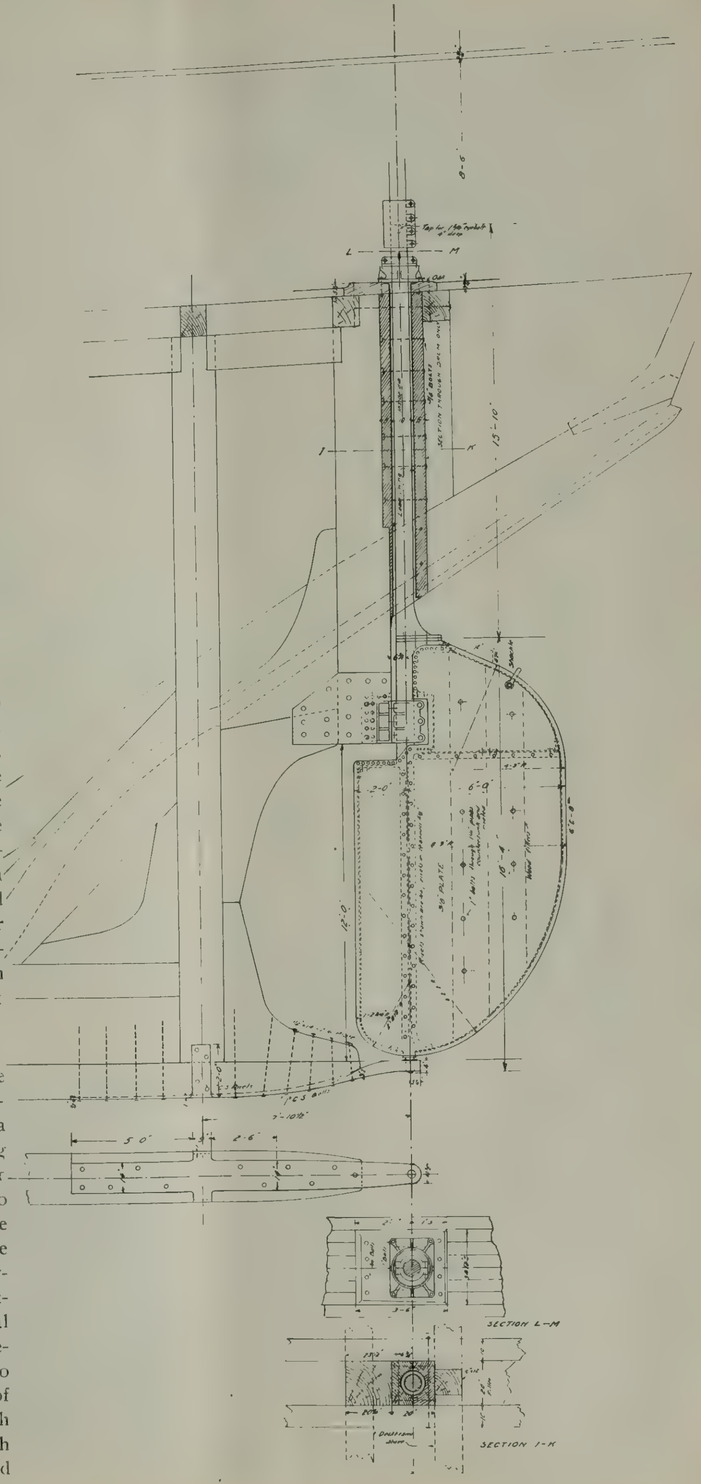


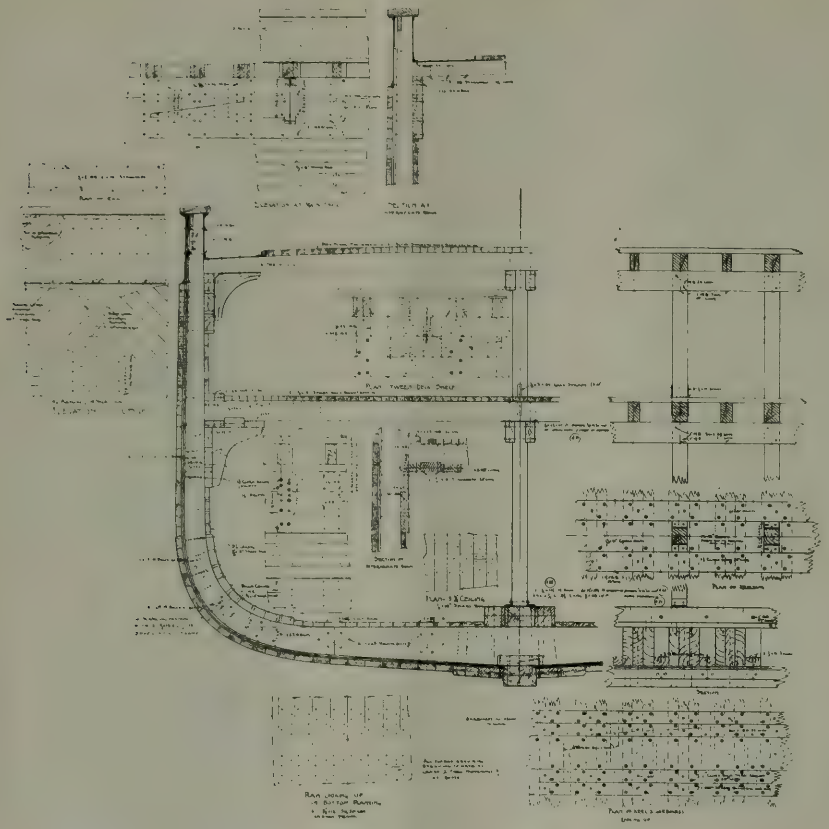
Longitudinal profile, poop and bridge-deck plan of the Supple & Ballin vessel. These craft will be fitted with steel shear strakes and other reinforcing embodying the result of years of experience in building large wooden hulls.

with wooden shipbuilding for nearly seventeen years, and where the ships are constantly in fresh water we allowed from fifteen to twenty years for the life of a wooden vessel, even though they were properly salted, and in many cases the top side would commence decaying before that time, requiring renewal before any other parts of the hull.

Accepting the diagonal planking as the most efficient method for obtaining rigidity and homogenity of the ship's sides, the question of obtaining a durable and efficient top cord in combination with this planking, led me to the adoption of a steel top side construction, as shown in the accompanying cross-section. There is no question that wood could be used in sufficient quantity to afford proper strength while the vessel is new, but the fact that these tops sides are subject to such unavoidable decay and consequent loss of strength, and counting their excessive weight and bulk, prompted me to adopt steel instead. The problem to solve was to combine the steel and wood in such a manner that it would always remain accessible for survey and repairs and combine its strength properly with the wooden members of the hull.

Douglas fir, like most woods shrinks against but not in the direction of its fiber. Considering this fact, I constructed a girdle section of steel, resting and butting on top of the frame timbers, which have no end shrinkage. The outside bulwark of sheer plate will be laid on top of the double diagonals, being first heavily coated with bitumastic of equal enamel, and while being reheated by a torch, bolted to diagonals and frames, part of these bolts passing through the inner bulwark plate. Both vertical plates are connected





Midship section and structural details of the vessels building at Supple & Ballin's Portland yard.

by angles to the horizontal rail plate, thus forming the girder mentioned. This bolting up will force the softened enamel into the joints and pores of the outside diagonals, producing an absolute tight grip the full depth of the plate in addition to the strength and connection obtained from the bolting.

To the lower edge of the inner bulwark plates are riveted the steel deck stringers, connected together across the top of the deck beams by steel diagonals, thus forming a rigid deck truss against horizontal racking strains.

All bolts used have nuts in accessible places, so that any subsequent shrinkage can be taken care of.

The design shown is that of a vessel of 286 feet water line length now building. In calculating the longitudinal strength of this design in comparison with an all-steel ship, built in accordance with the classification rules, we provided an excess of nearly 40 per cent, figuring the strength of wood as one-tenth that of steel.

The only place on top sides, where rotting could occur in this construction, is in the diagonals and top timbers. To protect against this, the diagonals and timbers are treated by immersion in hot carbolineum. As no moisture can touch the encased wood the danger of rotting is very remote, but should it take place repairs and renewals are still possible.

Having thus shown how longitudinal strength may be obtained by combining the diagonal planking with a steel top cord construction, and how thereby considerable weight and bulk may be saved, we will now turn to the method applied for gaining maximum transverse strength with the least amount of material.

As pointed out by W. H. White, ships built with diagonal planking require very little transverse framing. This may be explained by the fact that such planking acts in tension and prevents the fore and aft seams of the outer planking from opening under transverse strain. For this reason my frame centers could be increased to thirty-six inches, while the molded depth of the frames has been increased to eighteen inches at bilges. The pieces forming these frames are bolted together by machine bolts made accessible wherever possible.

As pointed out in previous articles, one of the weak points of wooden ships is found in the floors. By deepening them to thirty inches and by adding an extra floor to every frame and bolting the pieces together thoroughly by machine bolts this weakness is overcome.

Another of the unavoidable shortcomings of wooden ships is the shrinkage of timbers. Unavoidable as it is impossible to obtain any wood for construction except direct from the saw mill. People will talk of building ships of seasoned material, but this is impossible and impractical. We only have to consider that such ships as are now being built require over a million feet (board measure) of various lengths and scantlings and no mill or yard could store up enough bill-stuff material for seasoning. The only exception to this is made in planking and decking, which generally is cut far enough in advance to obtain fairly good air drying.

In order to reckon with this unavoidable shrinkage, provision is made in my design for taking care of it by securing all of the inside ceiling, shelves and clamps by screw bolts, having nuts exposed on inside of ship and always accessible. All clinched fastenings liable to loosen by shrinkage are carefully avoided.

As pointed out in my first article on "Shipbuilding" I showed the excuse existing fifty years ago for using treenails in outside planking. With the raison d'etre for this kind of fastening gone, its use is simply folly, as the wooden peg fastening does more damage to the whole construction than benefit. Boring a plank and frame full of large holes for such fastenings has as much excuse as to use wood pegs in shoes, a now forgotten practice.

Galvanized iron spikes one-eighth of an inch square to every inch of plank's thickness and penetrating the frames at least two and one-half times this thickness, will hold the outside planking more securely than treenails of double this size. Wherever a plank needs considerable bending to place, the butts should be fastened with two or more through bolts; having nuts on inside.

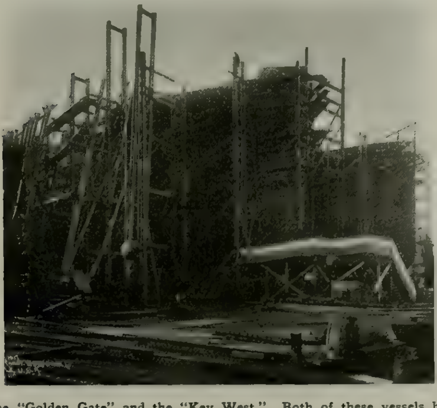
The ships now building from my designs are, so far as I know, the largest in capacity under construction. They will have a dead weight capacity of over 4000 tons. It is outside the scope of this article to go into details of construction and machinery equipment. When the vessels are launched and tried out full information will be furnished the marine papers.

In conclusion I will only mention that I am now working on plans for wooden steamers on the same general design, but 300 feet keel, forty-five molded beam and twenty-seven feet molded depth, having a dead weight capacity of 4500 tons.

The design has been prepared in collaboration with the American Bureau of Shipping and has been approved for highest classification.

Seattle's Pioneer Steel Builders

A DETAILED description of the plant of the Seattle Construction and Dry Dock Company is practically impossible at this time, owing to the fact that the entire establishment is being made over, modernized and improved to such an extent that descriptive matter that would cover the subject today would be out of date a month hence.



The "Golden Gate" and the "Key West." Both of these vessels have been launched since this picture was taken.

Speaking generally, there are six building ways, five of them of large size and one narrow ways, which will be utilized for building torpedo boat destroyers. There are two large floating dry docks attached to the plant, rendering the concern a highly important repair plant as well as a builder of new vessels. Two features which stand out in the general ensemble of this shipyard is the forge plant, one of the most complete shipyard forge shops in the country, and, as might naturally be expected in the heart of a timber country, the saw mill and joiner shop.

A remarkable amount of work is under way at the Seattle Construction and Dry Dock Company's plant at the present time despite the fact that the facilities are all being enlarged in every department and that new machinery is being installed and old tools discarded just as fast as the conditions of the machine tool markets permit. The present value of orders on hand totals about $32,000,000, and in the neighborhood of 3400 hands are steadily employed, two shifts being the order of the day in every department.

The overhead conveyor system for handling material to building ways consists of sixteen sets of poles bearing a two-inch wire having a span of

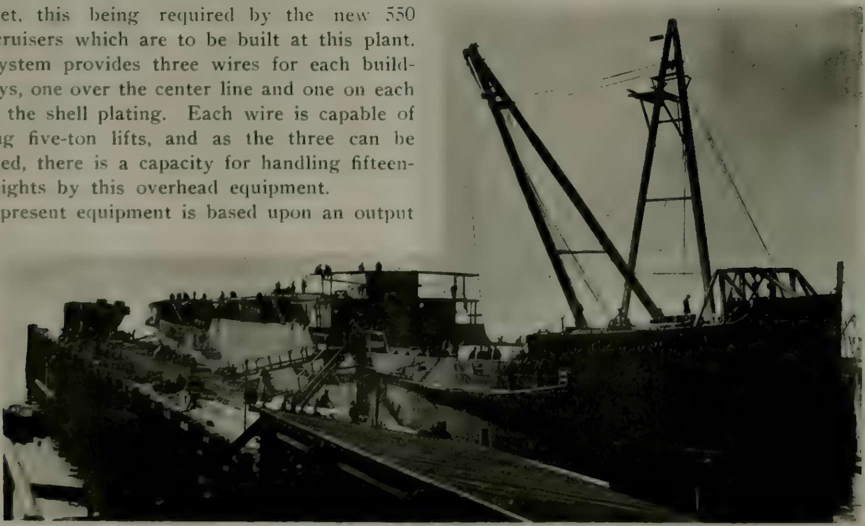
Mr. William H. Todd, head of a great shipbuilding interest including yards at Seattle, Tacoma and New York.

Mr. C. W. Wiley, President of the Seattle Construction and Dry Dock Company.

650 feet, this being required by the new 550 scout cruisers which are to be built at this plant. This system provides three wires for each building ways, one over the center line and one on each side of the shell plating. Each wire is capable of handling five-ton lifts, and as the three can be combined, there is a capacity for handling fifteen-ton weights by this overhead equipment.

The present equipment is based upon an output of one steamer per month. The Government work on hand includes two large scout cruisers, which, with the torpedo-boat destroyer, leaves two building ways available for building merchant tonnage.

In a few months the work of reconstructing this plant will be about completed, at which time we hope to furnish our readers with a detailed descrip-



The fitting-out slip at the plant of the Seattle Construction and Dry Dock Company.

Center bay in the machine-shop, showing the immense amount of work on hand at the present time.

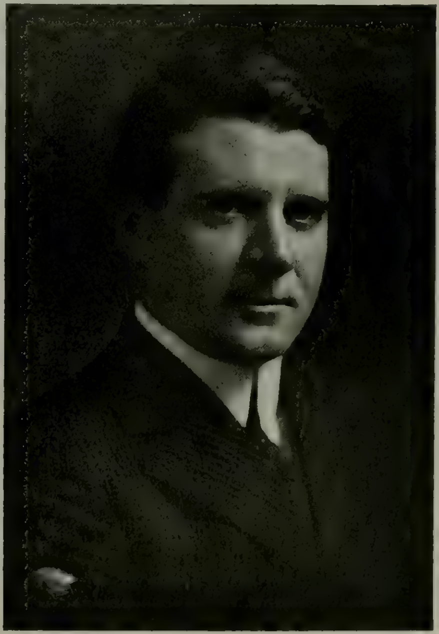
tion of what promises to be one of the most efficient shipbuilding plants in the United States.

SHIPBUILDING

THE steamer "Tiger," built to the order of the Standard Transportation Company of Delaware, was launched on April 20 at the Potrero plant of the Union Iron Works. The moulded dimensions of the "Tiger" are 410 by 56 by 33 feet 6 inches, her engines 27-47 and 78 inches cylinder diameters by 48 inches stroke and of 2600 horsepower. She is fitted with three Sotch marine boilers. She was christened by Mrs. C. O. Flint, daughter of D. G. Schofield, chairman of the Board of Directors of the Standard Oil Company of California.

The last yard to enter the steel construction field is that of D. J. Hanlon of Oakland, Cal. Mr. Dan Hanlon, the President of the company, recently returned from New York with the contracts for two large turbine driven freighters and work on the expansion of the Hanlon yard has already commenced.

Mr. H. W. Kent, Secretary and Treasurer of the Seattle Construction and Dry Dock Company.



Mr. J. E. Sheedy, Assistant to the President, Seattle Construction and Dry Dock Company.

J. F. Duthie and Company

At work on one of the first big steel hulls at J. F. Duthie and Company's plant.

THE plant of J. F. Duthie and Company, shipbuilders and engineers of Seattle, Washington, is a new one in every sense of the word and yet sprung out of an establishment that has had many years of successful marine and engineering endeavor to its credit.

The plant as it is at present constituted covers an area of about twelve acres and, roughly speaking, four acres are under cover, four in building ways and the remainder arranged for plate, shape and material storage. There are four building ways provided and the equipment and lay-out of the yard has been based on an output of one large steel vessel per month.

The steel fabricating shop is a very extensive structure, being 900 feet in length, and is fitted with electric overhead traveling cranes. Great care has been taken in outfitting this shop with high grade modern tools, among them being 30 and 15-foot planers, 30-foot bending rolls, 12-inch beam benders, batteries of punches with wide ranges as to capacities, plate shears, double angle shears, etc. In addition to the overhead crane system, the large tools are served individually by cantilever wall cranes, on which both travel and hoist are operated pneumatically.

The steel fabricating shop is located parallel to the building ways and the machine and blacksmith shops are housed in one building on the opposite side and also parallel to the ways. The two shops being in one building, are served by the same traveling crane. The outfit in these shops is complete, the firm doing all the machine work on castings, shafting, boiler materials, etc.

The woodworking shops are located in one large building, the carpenter, joiner and pattern shops being fully up to the high standard usually set in shipyards located in big timber country.

The furnace shop is equipped with two large angle furnaces and a large plate furnace. The angle furnaces are constructed of steel tubular shells lined with fire brick, this being found the cheapest and quickest method of construction.

The handling system over the building ways consists of aerial tramways similar to those in use at some of the other Northwestern shipyards. In the Duthie yard, however, four separate cables are provided to serve each ship instead of two or three, as is the usual custom. These cables can be operated either independently or in conjunction, their combined efforts being capable of handling the heaviest weights that have to be placed on a ship prior to her launching. The hoists operating the lift and travel on the trolleys of the aerial are located on towers about seventy-five feet high, the operator having at all times a clear view of the load and its destination.

There is a complete system of standard gauge railroad tracks leading about the yard and shops and miscellaneous material is handled about by two locomotive cranes of ten and twelve tons capacity, respectively.

The shape and plate storage yard is located on one side of the plant and is served by two circular cranes, which are in effect stiff leg derricks with an 80-foot boom, giving them a sweep of 160 feet in diameter, and capable of turning a complete circle in one minute. These cranes lift the steel from incoming cars and stack it in the plate and shape racks, from whence they transfer it as needed to cars, which are shunted to the steel fabricating shop. In this way the locomotive cranes are relieved from this class of work and are always at

One of the ways at the Duthie yard, Seattle, showing inner bottom of one of the big freighters building at this plant.

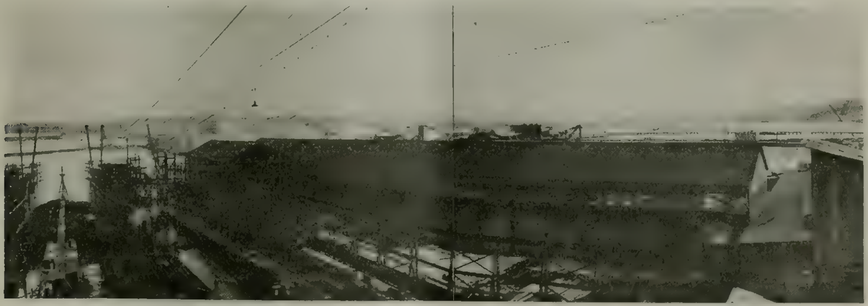
The stiff leg-derrick cranes covering the plate and shape storage space at the Duthie plant.

liberty to do the general handling of material and shunting of cars around other sections of the shipyard. These circular cranes were designed and built by the Hesse-Martin Co., of Portland, Ore.

J. F. Duthie and Company, in creating their new shipyard, have had a constant eye on the welfare of their employees, as is attested by the presence of a small, but well equipped, hospital on the ground with a trained nurse in constant attendance and a physician on duty during certain prescribed hours of the day.

The Duthie yard at the present time has ten ships on order, all general cargo vessels of the same type and size, being 423 feet 9 inches long, by 54 feet beam by 29 feet 9 inches moulded depth. These vessels will be propelled with geared turbines of 2500 horse power and steam will be supplied by Scotch boilers.

View of the waterfront of J. F. Duthie's shipbuilding plant, Seattle, showing the three building-ways located between the two shop groups.



It will be noted that the main shop buildings parallel the biulding-wayson either side, the material movement from fabricating shops to ship hulls being direct.

General view of the Skinner & Eddy plant at Seattle, Washington.

A Remarkable Construction Record

SINCE the organization of the Skinner & Eddy Corporation, in 1916, they have built and delivered four 8800-ton cargo vessels and two 9500-ton oil tankers. Thus by the anniversary of the laying of the first keel they have launched and delivered a total of six vessels, or 53,000 tons, for the year.

The three 8800-ton cargo vessels delivered and in operation are the "Niels Nielsen," launched September 21, 1916, which has already completed two round trips across the Pacific; the "Hanna Nielsen," launched October 23, 1916, now on her way from Calcutta to Cape Town and from thence to Boston; and the "Luise Nielsen," launched January 26, 1917, and which is making regular trips across the Pacific.

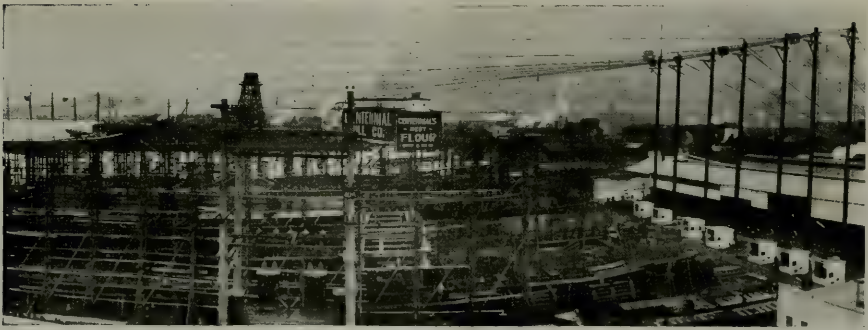
In addition to these three vessels the company have under contract and construction for the same owner four more vessels, all sister ships. Another one of these will be launched the middle of May.

The 9500-ton oil tanker delivered in May is the "S. V. Harkness," launched March 22, 1917, built for the Standard Oil Company. The second vessel of this type for the Standard Oil Company was launched April 21, 1917, and will be ready for delivery the early part of June.

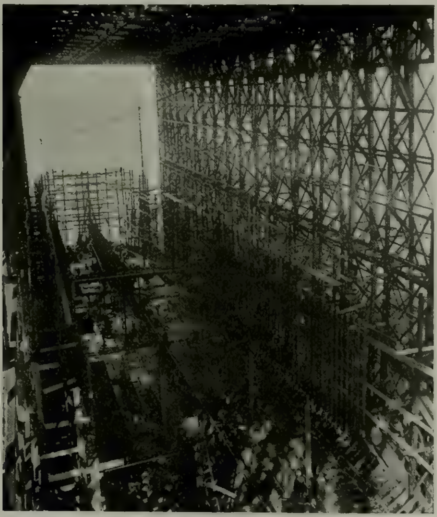
Launch of the "S. V. Harkness" at the Skinner & Eddy Corporation plant.

In the delivery of the "Luise Nielsen" the company achieved a record in ship construction on the

The "Niels Nielsen," a Skinner & Eddy product, on trial.



This picture illustrates the trolley system for handling material over the building ways.



Looking down in one of the big building berths.

Pacific Coast for a vessel of this type and size. The keel was laid September 23, 1916; the vessel launched January 23, 1917; delivered ready for cargo March 10, 1917, and sailed with full cargo for Yokohama, under charter to Frank Waterhouse & Co., March 17, 1917, or a total of five months and fifteen days from laying of keel to the date of sailing with cargo.

The "Nielsen" steamers are of the following dimensions:

Length over all	423′ 9″
Beam moulded	54′ 0″
Depth moulded	29′ 9″

The vessels are built to Lloyd's Class 100 A-1, single screw, of the poop, bridge and forecastle type, machinery amidships. Arrangements are made in the design and construction for burning either coal or fuel oil. The propelling machinery consists of one set of Curtis geared turbines, steam being supplied by three Scotch marine boilers fitted with superheaters.

The oil tanker delivered to the Standard Oil Company is the "S. V. Harkness." This vessel and the vessel launched April 21, 1917, and the third one under contract, are of the following dimensions:

Length over all	435′ 6″
Beam molded	57′ 0″
Depth moulded	31′ 6″

Single screw, built on the Isherwood system, the machinery being aft. The propelling machinery consists of one set of Curtis geared turbines, steam is supplied by three Scotch marine boilers

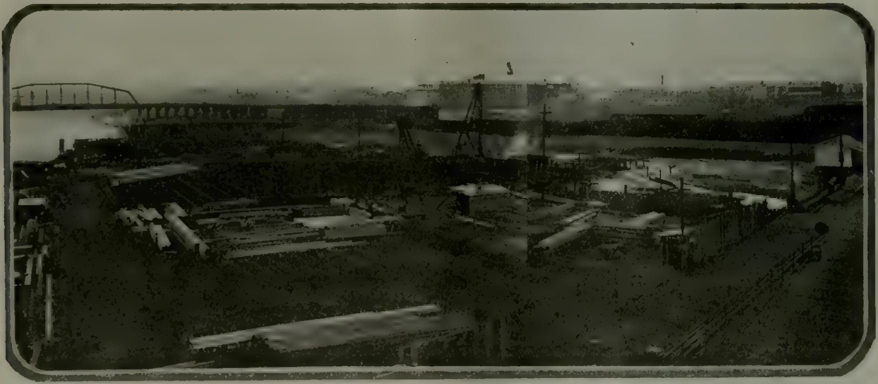
The freighter "Luise Nielsen" departing on her maiden trans-Pacific voyage.

fitted with superheaters, and the vessel is built to Class 100 A-1, with Lloyds.

The Skinner & Eddy Corporation have under contract a number of vessels of the 8800-ton type and, to increase their capacity, have recently added to their plant additional property, giving them now more than fifteen acres of valuable waterfront. They now have three building-ways and are constructing a fourth capable of accommodating a 600-foot vessel, which will be ready within thirty to sixty days. The plant employs approximately 3,000 men.

One of the features of the Skinner & Eddy yard is the speedy method of handling the material over the ships by means of cable conveyors. This method was designed and successfully put in operation by Mr. David Rodgers, general manager of the works, and is constructed principally as shown by the accompanying photographs. The cable conveyors are capable of handling weights up to 10½ tons and of making the trip from a point on the ground at bow of ship to the furthermost point at stern, in from three to four minutes with load. Electrical winches are used for hoisting and operating, and electrical signaling from the ship to the winch operator has been incorporated into the system, making it a very complete and rapid method of handling material and comparatively cheap of installation.

Another new feature at this plant is a portable scarphing machine for cutting scarphs or beveling the edges of plates. The usual method of scarphing is by means of the old-style stationary method or by air-driven chipping tools, both of which are exceedingly slow, inaccurate and expensive. The advantage of this scarphing machine can easily be understood when it is known that with this method a complete, clean and accurately machined scarph can be cut in fifteen minutes, as compared to one hour and fifteen minutes by the old system of chipping.



General view of the Supple & Ballin yard at Portland taken February 4, 1917, showing dredges and pile-drivers at work.

A New Departure In Wooden Ships

ALMOST over night probably the most modern yard for building a new type of wooden ships of largest dimensions has sprung into being in Portland, Or.

Where only two months ago there existed right in the heart of the city the ruins and burned piling of the Standard Box and Lumber Co., an eyesore to passers-by, today shops and four building shipways have been completed and two 4000-ton freight carriers have been put in frames.

We reproduce herewith photographs of the plant and call our readers' attention to the first picture, taken on February 4, 1917. It shows pile drivers at work on the ways with one of the port of Portland dredgers making a fill, raising the ground level with the railroad tracks, a job which required nearly 80,000 yards of river sand. Today the whole yard is planked over, tracks are laid for locomotive cranes, a new swinging gantry is installed with an eighty-foot boom capable of lifting a weight of two and a half tons at end of boom and fifteen tons half way. Switches and side tracks have been laid and loaded cars are delivering material underneath the electric craneway running into the plate and blacksmith shops.

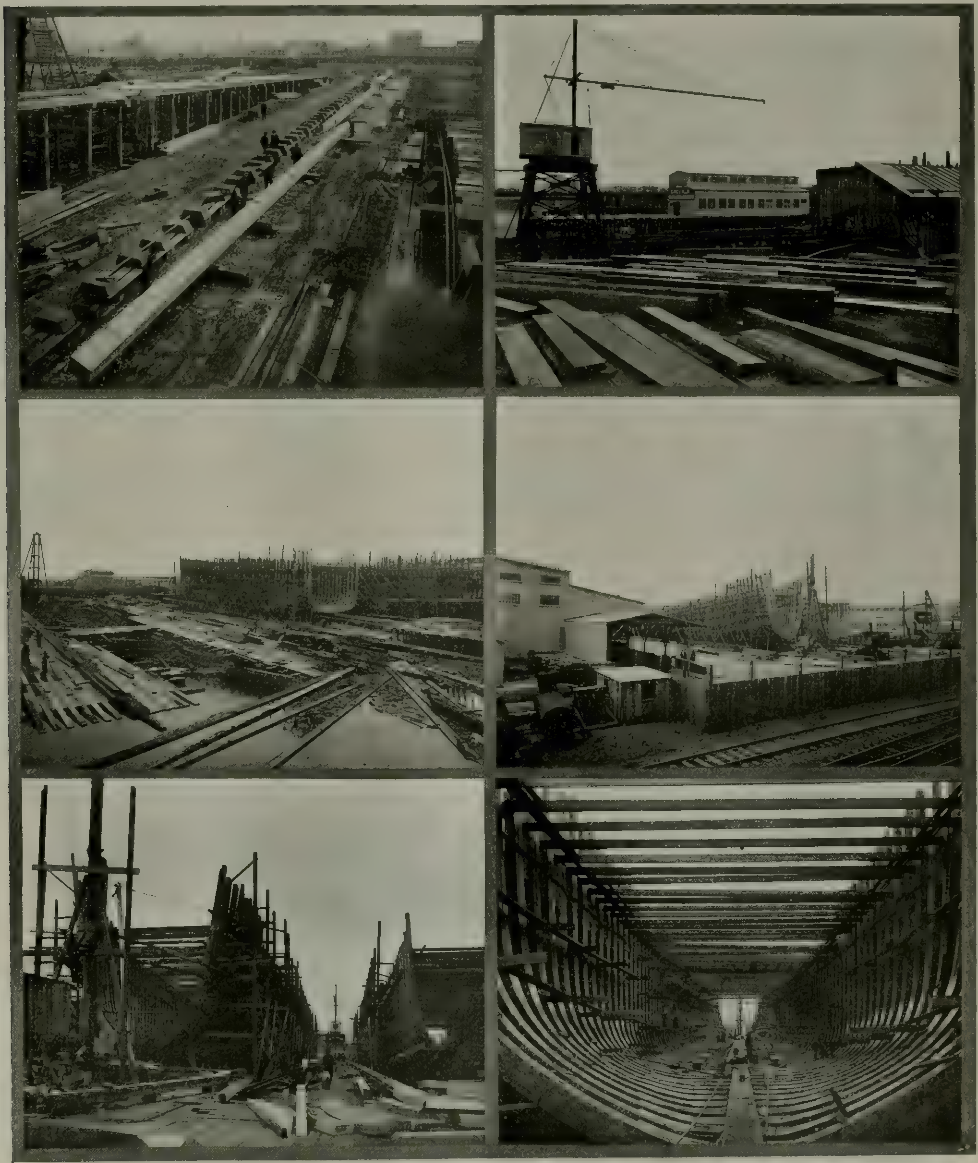
The main building is three stories high and over 200 feet in length, facing E. Oak street and has an overhanging roof on the yard side twenty-four feet wide and 250 feet in length, underneath which woodworking tools are placed, allowing the men to work under shelter. The ground floor contains storerooms, toolrooms and offices, the second floor drafting rooms, men's rest rooms, rigging lofts and storerooms, while the entire upper floor is used as mold loft, 200 feet in length and forty feet clear in width, double-diagonal floored and smooth as a billiard table.

There are two saw sheds, housing the largest size modern Fay & Egan band saws, cut-off saws, etc., all motor driven.

The locomotive crane track runs between these sheds, taking the sawed frame timbers to the gantry and framing platforms. This crane has a forty-foot boom and ten-ton capacity.

The second picture, taken March 1, 1917, shows number 1 building ways completed, keel blocks laid and the keel timbers scarfed and ready to be placed. This picture proved to be of special interest to Mr. Brent, the vice-chairman of the U. S. Shipping Board, as the three sticks forming this keel had each a length of over a hunded feet, showing the kind of ship timber Oregon forests can supply.

Picture number 3 shows shipways number 2



Group of pictures in the Supple & Ballin shipyard. These views are referred to in the text, those on the left being designated as numbers 2, 3 and 4, and those on the right as numbers 5, 6 and 7.

completed and numbers 3 and 4 just being planked over. Between these latter two another track bed will be built on piling, similar to the one shown on pictures numbers 4 and 5, it being planned to have a gantry serving every two vessels.

On picture number 5 the gantry is shown in the foreground, while in the distance can be seen the plate shop and fitting out wharf.

Photograph number 6 shows the overhanging roof of the main building and the bow view of the two ships under construction, with the stern for number 1 in position.

In photograph number 7 an interior view of the ships is given, looking forward, showing by comparison with the carpenters at work dubbing the immense size of the structure. It also shows the system of triple floors employed by builders and the bolting used in assembling the frame members.

The power plant is not shown in the photographs, but it might be of interest to mention that steam is furnished by a large locomotive type marine boiler with an extra large fire box in which the waste lumber can be used up to advantage.

The power house contains an electric driven Ingersoll-Rand air compressor of 450 cubic feet capacity and a steam driven compound compressor of the same make having 1080 cubic feet capacity. Also a steam engine driving a counter shaft running into the plate shop, so arranged that it can be used instead of the motors whenever a surplus of waste wood is available for fuel. Otherwise all the machines and tools are fitted with independent motors.

As the type of ship under constuction will have steel topside, including sheer and bulwark plates, deck stringers and steel main deck knees, also steel rudder and as nearly a hundred tons of steel will be required for the oil fuel and water tanks, it was necessary to equip the plate shop with regular shipyard tools found in steel building yards, incluring a 1500 pound steam hammer and blacksmith forges.

In the gallery floor of the plate shop will be located the machine tools. Adjoining the shop will be a modern galvanizing plant, there being required for each ship nearly 200 tons of galvanized fastenings and fittings.

At the request of the Shipping Board Supple & Ballin have made arrangement to expand their present yard still further north and when present plans are completed the plant will occupy seventeen and a half acres of ground and have six building ways, from each of which a 4500-ton steamer can be launched every four to five months, depending only on the deliveries of steel materials, as the saw mills in Portland have no difficulty in furnishing the wood material as fast as needed and as the labor conditions at present are favorable. Supple & Ballin have a card application system and more than 1600 men are on the waiting list. With modern air tools and other facilities, house and bridge carpenters can do considerable work formerly done only by ship carpenters, but as there is plenty of work ahead for all open shop conditions prevail in Portland and no trouble with unions is looked for.

The Rolph Shipbuilding Company, which purchased the old Bendixen yard, has already purchased adjoining property and the work of expandthe plant will shortly be under way.

The Pacific Shipbuilding Company of Alameda is preparing to move its plant to a more extended piece of property. The new site is also on the Alameda side of the estuary.

Edgar Ames, President of the Ames Shipbuilding and Dry Dock Company of Seattle, returned from the East in early April with contracts for three 8,500 ton deadweight carriers for the Cunard Company. This gives the Ames yard a total of twelve large steamers to build. It is understood that work on the 10,000-ton floating dry dock for this concern will be started at once.

General view of the two building slips, now occupied with vessels, showing handling space between hulls.

The Center of Portland's Steel Industry

THE energy with which northwestern firms have met the shipbuilding opportunity is nowhere better exemplified than in the plant of the Northwest Steel Company at Portland, Oregon, a concern that has entered the shipbuilding field to stay.

The plant of the Northwest Steel Company covers approximately fifteen acres, having 850 feet of water frontage with a dock 400 feet long and 100 feet wide. The yard has four building slips 73 feet wide and capable of handling vessels up to 525 feet in length. Each slip is served with a double aerial tramway,. operating from a 60-foot tower at the end of the ways.

The shop buildings are constructed at the side of and parallel with the building slips. Bending slabs are located alongside the slips at both ends of 60-foot and 40-foot angle angle furnaces under a shed 40 by 180 feet in size. Two emergency punches and shears and one angle shear are located near the bending slabs for emergency and miscellaneous use.

The plate shop proper is 60 by 400 feet in extent and houses bending rolls, plate planers, wall reamers, punches, shears and layout skids, served by two 5-ton overhead electric traveling cranes. Air driven, cantilever wall cranes are used to serve the individual machines.

The main structural and plate shop is 64 feet wide by 820 feet long and is served by a fifteen and a five-ton overhead electric crane. This building houses punches, heavy duty drills, wall reamers, bulldozers, shears, skids and cranes for compression riveters, also painting and inspection skids.

The auxiliary beam or plate shop is 53 feet wide by 280 feet long, handling being taken care of by a ten-ton overhead electric crane. This structure contains punches and layout skids only. Both the auxiliary and the main shops are fitted with cantilever wall cranes, all air driven, for the service of individual tools.

The mold loft is a single story building, 80 by 408 feet in size, a departure from the ordinary, it being the usual custom to have the mold loft over one of the plate working sheds.

Bolts and rivets are turned out by a plant housed in a building 53 by 150 feet in dimensions. This shop is equipped with two hand feed headers with furnaces and a continuous heading machine with a 20-foot furnace, together with all the usual threading, pointing and nut tapping machines. The capacity of this plant is from twenty-five to forty tons of bolts and rivets per day, this high capacity being in contemplation of handling considerable outside business in the shipbuilding line besides the firm's own contracts.

Forging is carried out in a shop 53 by 120 feet in size, equipped with the usual assortment of air and trip hammers, forges, furnaces and special tempering equipment for handling tool work. A machine shop 53 by 80 feet in size is well equipped for handling miscellaneous work and repairs around the yard.

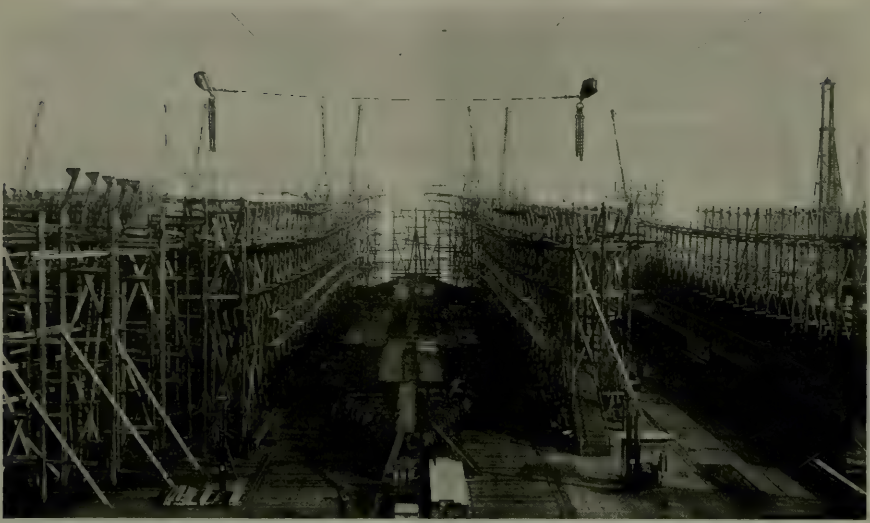
A compressor house 53 by 60 feet in size is fitted with a battery of seven compressors, four of which have a capacity of 1500 cubic feet of free air per minute each.

A pipe shop, 40 by 200 feet in size, is located at the head of the ways, while another building, having a floor area of 53 by 100 feet, is utilized for the storage of heavy material, its upper floor being occupied by the templet and pattern shop.

The main stock yard is parallel to and north of the main shop, being 59 feet wide and 880 feet long, with a five-ton electric crane covering the entire length of the yard, which includes angle shears, friction and cold saws, plate shears and straightening rolls for the handling of stock material. A storage yard north of and parallel to the main stock yard has a ground area of 65 by 400 feet, all of which is reached and served by a fifteen-ton overhead electric traveling crane.

The dock is at present used for the storage of steel and is served by two circular electric cranes, having a swing 120 feet in diameter. There is a large storage yard with racks for plates at the

The "Vesterlide" being towed to the plant of the Willamette Iron and Steel Works to receive her boilers.



Building-ways and overhead trolley system at the shipbuilding plant of the Northwest Steel Company, Portland, Oregon.

head of the building slips, this area being served by an electric gantry and two locomotive cranes, the latter being also used for switching on several receiving and shipping tracks which run across the ends of the storage yard and also across the ends of all the shops.

A number of small buildings scattered around the plant are being utilized as offices for inspectors, timekeepers, stock clerks, etc., and notable among these smaller structures is a well-equipped emergency hospital, at which a trained nurse is in attendance at all hours, night and day.

Vessels already on the stocks at the Northwest Steel Company's plant number four and these will be replaced by similar craft as fast as they can be launched. The company is building a standardized freighter, 425 feet in length by 55 feet beam and of 8800 tons deadweight capacity. They will be driven by geared turbines, steam being supplied by Scotch marine boilers fitted for either coal or oil fuel, and the speed will be 11 knots per hour.

In addition to the ship work on their own contracts, the company is fabricating a considerable amount of material for other shipyards, some of which are subsidiaries of the Northwest Steel and others entirely independent.

As will be noted from this brief summary of the plant of the Northwest Steel Company, the concern is equipped efficiently, both as to tools and handling methods, and its successful venture into the shipbuilding field would indicate a permanency and solidity for the future of the industry in and about Portland, Oregon.

The steamer "Firwood," 235 feet long by 42 feet beam by 25 feet depth of hold and fitted with a 1000 horsepower triple expansion engine and two Scotch boilers, was launched at the South Bellingham, Wash., yard of the Pacific American Fisheries on April 4.

Mr. R. M. Ostermann, Vice-President of the Locomotive Super-heater Company of New York and Chicago, was a visitor to San Francisco during the middle of April.

At a meeting of the Board of Directors of the firm of Eccles and Smith held in San Francisco on March 31, Mr. Chris Eccles was elected President and Manager and Mr. C. F. Bulotti, Secretary. Mr. Chris Eccles was born and educated in the University City of Dublin; came to San Francisco in 1885, and after founding the railway, light and power department in one of the largest institutions of the city, went into business with the late Edwin V. Smith in 1900. Since that time the business of the firm of Eccles and Smith has grown to be one of the largest in its line on the Pacific Coast, its patronage extending from the Arctic Circle to South America and from Utah to the Orient. Mr. Charles F. Bulotti, the Secretary, has been with the concern for 17 years. Eccles and Smith have stores in San Francisco, Los Angeles and Portland, Ore., carrying stocks in all of these cities and dealing in railway supplies, machine tools, small tools, pneumatic and electric tools, air compressors and iron and steel products.

General view of the plant of the Columbia River Shipbuilding Corporation showing position of the building-ways relative to the shops.

A Carefully Planned Shipyard

The large mold loft at Portland's latest big steel shipbuilding plant.

THE Columbia River Shipbuilding Corporation is located on the west side of the Willamette river, adjacent to the plant of the Northwest Steel Company, described in the January issue of the "Pacific Marine Review."

The ground area is approximately fourteen acres between the railroad right-of-way and the river.

The general offices of the company are in a two-story building, 40 by 65 feet, with the main offices on the first floor and drafting room above.

There are three building ways completely decked over, capable of handling ships up to 525 feet long. The ways are served by an aerial tramway system that has within the last two years been developed to a high state of perfection for this class of work. Electric winches placed in towers at the head of each slip actuate the hoist and travel. The operator at all times has an unobstructed view of the work and the hookman.

The largest shop in the plant is the plate shop, which is 595 ft. by 56 ft. in the cover portion, and has an extended crane runway of 200 feet more. The plate annex built on the south side, where the lighter work is handled, is 240 ft. by 31 ft.

Within these two buildings are housed all the punches, shears, riveters, etc. The arrangement of tools in the plate shop is such that the material passes through in one continuous direction, the work being laid off at the east end of the shop and is delivered on cars to the head of the ways from the west end, ready

Interior view of plate shop at the Columbia River Shipbuilding Corporation's Portland plant.

for erection. Each machine in the plate shop is served by two wall cranes actuated by air. The heavy pieces are handled by two five-ton electric traveling cranes.

The punches for handling the work on the frames or other bent shapes are located outside the shop and are so arranged that the frames are delivered from the bending slabs to the punches close by with a minimum amount of handling.

The furnace shed is adjacent to the plate shop in a building 40x180 feet. It is fitted with a 60-foot furnace and a large slab at each end. The shapes are handled with electric capstans.

The mold loft is in a well-lighted frame building, 80 by 200 feet. The loft is on the upper floor and the joiner shop below Templates are stored overhead in racks, and an air heating and ventilating plant is installed to keep the temperature uniform. The joiner shop is equipped for doing all the usual joiner work, painting, polishing, etc.

A boiler shop is now being built and fitted for handling Scotch marine boilers, and will be fitted with the largest size bulls, flange press, rolls, etc., for handling any size boiler. The main shop will be 130 ft. wide by 132 ft. long, with an extended crane runway of 132 ft.

The machine shop for maintenance and repair work, and the smithshop are located in a building 50 by 160 feet. The smithshop will handle all the usual ship work except heavy shafting. A storehouse, 50x160 feet, serves for a general warehouse and issuing center for small material.

The power house is housed in a building 50x80 feet, and contains three large motor-driven compressors of ample capacity to insure a pressure of 100 lbs. at the ways.

The fitting out dock is 100 feet wide by 180 feet long, and will be equipped with a set of shear legs capable of lifting eighty tons. A track is lead directly beneath the shears and is submerged so that the car deck is flush with the dock.

At the present time the company has contracts for six 8,800-ton freighters to be built on the transverse system, and three ships of the same tonnage to be built on the Isherwood system. The keels for the first two ships have been laid, and construction is being rushed. The first boat will probably be launched early in August.

Waterfront view of the Winslow Marine Railway and Shipbuilding Company's plant at Winslow, Washington.

An Interesting Wooden Ore Carrier

THE "Anyox" is a new combination wooden ore carrier and towing vessel now under construction at the yard of the Winslow Marine Railway & Shipbuilding Co., Inc., at Eagle Harbor, Winslow, Washington, for the Coastwise Steamship & Barge Company of Seattle, Washington.

This company operates a fleet of steamers and barges in the ore-carrying and freighting trade between Puget Sound and Alaskan ports and British Columbia, and the "Anyox" has been designed primarily with the object of meeting the conditions of this trade.

The general description and dimensions of the "Anyox" are as follows:

Length over all	205′ 6″
Length from after end of stem to fore side of stern-post	184′ 8″
Beam moulded	38′ 8½″
Beam outside of planking	39′ 8½″
Beam inside of ceiling	34′ 0″
Depth of hold	19′ 9″
Depth moulded	23′ 4″
Dw. cargo capacity	1280 tons

The vessel is to have a single deck with raised deck forward, with crew's quarters underneath. The house is placed amidships on the main deck and extends out to the line of the fore-and-aft hatch combings, housing in the machinery space, which is also located amidships, and having pilot-house, bridges and texas, containing captain's quarters located on top of same.

Two cargo holds are provided for, one forward and one aft of the machinery space. Each hold is provided with large hatches in main deck.

An interesting and unusual feature of construction is the provision of two continuous longitudinal bulkheads, extending from the floor of the hold to the deck, one on each side in line with the fore-and-aft hatch combings; the portions of these bulkheads in the cargo holds are built up solid of wood and those portions at each side of the boiler and machinery space are built of fabricated steel, having openings giving access to the wings where pumps and some of the auxiliary machinery is to be located. The major portion of the fuel-oil tanks is also located in these wings. The side combings for the hatches are also continuous from bow to stern and form the side-sills for the main deck-house.

Captain James Griffiths, President of the Winslow Marine Railway and Shipbuilding Company.

The vessel is to be rigged with two masts equipped with cargo booms for handling the cargo from both hatches.

The main engine is a triple-expansion engine of approximately 1000 i. h. p. at 120 r. p. m., with a working pressure of 180 lbs. per sq. in. Cylinders are 17x27x44 by 30-inch stroke. The propeller is of the iron-hub type having bronze blades.

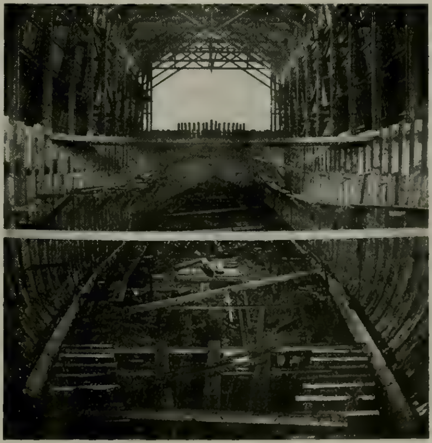
The two boilers are of the Heine water-tube type built by the Union Iron Works of San Francisco, and are placed side by side, and fired from the forward end. Oil is used for fuel, the oil-burning system being of the Coen design, with tankage of 2300 bbls., which is ample for any trade the vessel may engage in.

A steam steering gear of the Williamson type combined with hand gear, is provided.

Two friction-drum cargo winches are installed for each mast, two located on the forecastle deck and two on the top of the main deck-house over the towing machine.

A size "G" steam towing machine, as manufactured by the American Engineering Company, will be installed on the main deck at the after end of the main deck-house, equipped with guide rollers and having heavy roller fitted out at stern on

The covered ship-shed at the Winslow plant.



Interior view of the framing of the "Anyox."

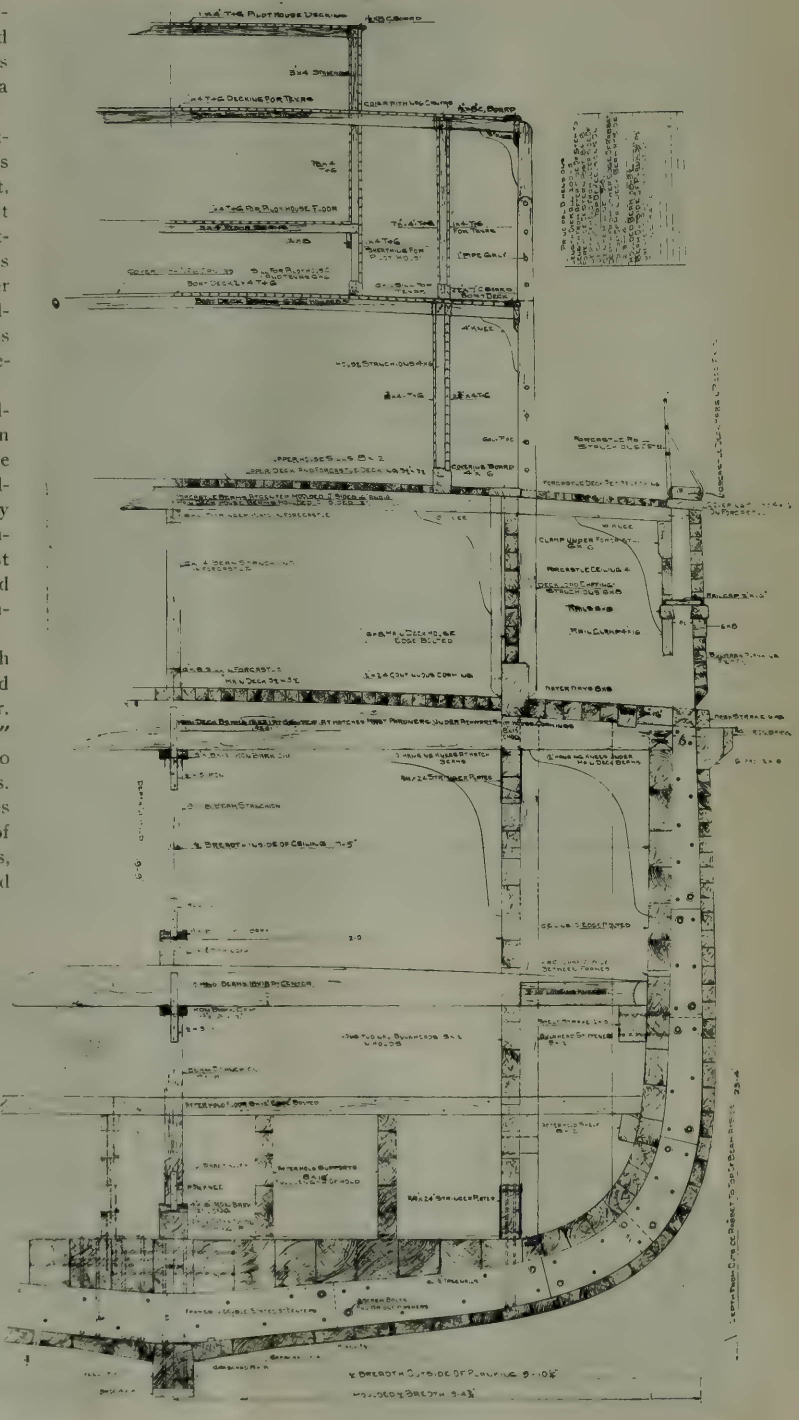
bulwarks for lead of towing hawser. A heavy towing hawser is provided with all attachments complete for deep-sea towing operations.

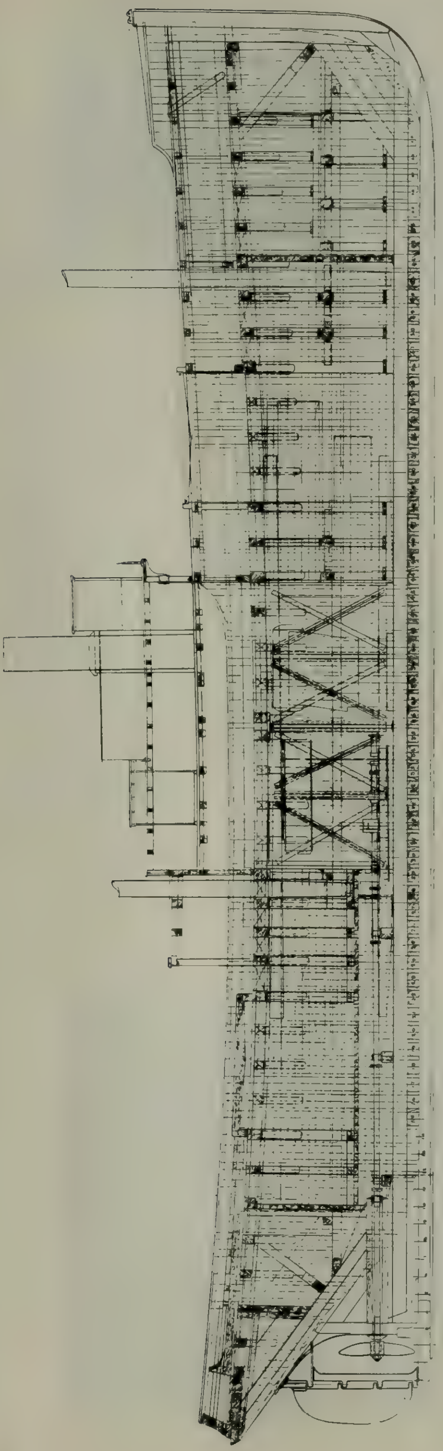
The vessel will be fitted with electric lights and wireless equipment, and the vessel fitted out complete in all appointments as a first-class combined freight steamer and tow-boat in accordance with Bureau Veritas classification requirements.

Among the many modern and novel features in this vessel will be the electric range in the galley. This is furnished by the General Electric Company and is of the latest design and most approved type. A powerful searchlight is also provided.

The material from which the hull is constructed is selected Douglas fir. Frames are spaced 30″ centers and fastened to keel with 1⅛″ drift bolts. Spaces between frames at keel and in wake of machinery, sea valves, etc., are fitted in solid with timbers moulded the same depth as the frames. In short, this vessel, with her staunch and heavy construction, represents a combination of the most modern and approved features of the wooden shipbuilding art today on the Pacific Coast.

The two holds, together with the cargo-handling equipment, have been especially designed for ore carrying, with the object of rapid loading and dispatch in view. The designs and plans for the "Anyox" are from


1×4 T+G Pilot House Decking
3×4 Stanchions
1×4 T+G Decking for Texas
1×4 T+G for Pilot House Floor
Boat Deck 2×4 T+G
Boat Deck
Upper Deck and Forecastle Deck
Forecastle
Clamp under Forecastle
Forecastle Ceiling
Rail Cap
Main Deck
Water Ways
Sheer Strake
Stringer Plates
Breadth Inside of Ceiling
Hold Beams
Keelson
Bilge Keelsons
Garboard
Keel
½ Breadth Outside of Planking 9-10½
Moulded ½ Breadth 9-4½
Depth from Top of Rabbet to Top of Beam 23-4



Inboard profile of the "Anyox" showing system of bracing employed.

the boards of Mr. Harvey C. Nugent, naval architect for the Winslow Marine Railway & Shipbuilding Company, under direction of Capt. James Griffiths, president of the Coastwise Steamship & Barge Company. Mr. John L. Hubbard, general manager of the Winslow Marine Railway & Shipbuilding Company, and superintendent of the yard, is in personal charge of the work on the vessel, and Mr. C. C. Lacey has had charge of the engineering features of the craft.

The primary idea was to design a vessel adapted to both ore carrying and towing. The size and dimensions were carefully worked out for towing work and ease of handling in narrow waters and are still large enough to make the carrying capacity a commercial proposition.

A NINETEEN-SEVENTEEN CONCERN

The National Shipbuilding Company is a new concern, having been in operation only during the present year. Several small craft were turned out and then the concern was completely reorganized, now being incorporated for $2,000,000. Work on the yard itself is progressing rapidly and it is the intention of the concern to shortly lay the keels for four vessels, which will be constructed for the market.

The National Shipbuilding Company has twelve acres of land located within the city limits of Seattle, a directorate made up of well-known men and the nucleus for a strong yard organization in a carefully selected group of mechanics. There is no reason why this new plant should not rapidly assume an important place amoung the leading wooden shipbuilding yards on the Pacific Coast.

Plans for the completion of the yard, details of which we are not at liberty to make public at this time, are based on the continuous movement of material principle. The progress of work from the raw to the finished state is steady and always in one direction. Machinery is now being installed and the next few weeks should witness the completion of another splendid wooden shipbuilding plant for the Seattle district.

Mr. F. L. B. Heward has been spending the past month on the Pacific Coast in the interests of James Howden and Company Limited of Glasgow, Scotland. Mr. Heward's presence is occasioned by the placing of large tonnage orders on this coast by the Cunard Steamship Company, which concern has made a practice for many years of fitting their vessels with the Howden forced draught system.

The ship tool-shop at the Ames Shipbuilding and Dry Dock Company, Seattle, Washington.

A Complete and Modern Plant

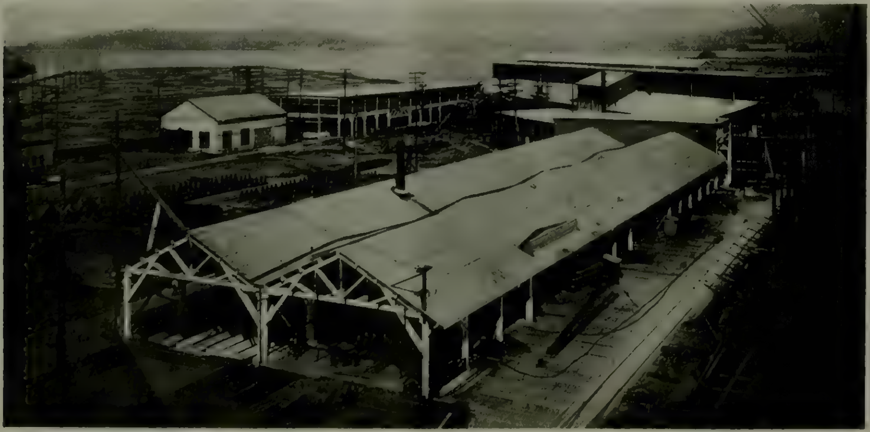
WHILE the Northwest has witnessed some remarkable records in the construction of shipbuilding plants, the erection of shipways and buildings at the plant of the Ames Shipbuilding and Dry Dock Company of Seattle will stand comparison with the most rapid construction work recorded. Starting work on a vacant sand fill on December 1st, 1916, by the middle of March the various shops had not only been built and equipped but three ways had been put in and the keels of two steamers laid. It must not be inferred from this rapid construction that the Ames plant is of a slipshod character. To the contrary, the plant was installed after the most careful consideration and the entire group of buildings and ship ways were carefully planned with a view to thorough coordination.

The officers of the Ames Shipbuilding and Dry Dock Company are Edgar Ames, President; George W. Albin, Secretary and Treasurer, and David Hollywood, General Manager. Mr. Hollywood spent some time as manager of the drydocking and repair department of the Seattle Construction and Dry Dock Company and later for many years was manager of the dry dock business of the Heffernan Engine Works.

The layout of the plant was entrusted to the firm of Lee and Brinton, naval architects, Seattle, and the work was done by various contractors under the direct supervision of Mr. Hollywood. The heads of the various departments at the new yard include Mr. John Wilson, general superintendent; Mr. R. J. Wright, superintending engineer; Mr. Harvey Wharton, superintendent of Steel construction, and Mr. C. Barron, purchasing agent.

The property on which the plant has been built has a water frontage of 1,160 feet. The property itself is irregular in shape with a depth of about 600 feet. The building berths, four in number, are on the south side of the property and these ways are capable of taking 500-foot ships. A fitting out slip served by a 100-ton shear legs has been provided and an 8,000-ton floating dry dock is to be built, which will mean that the Ames Shipbuilding and Dry Dock Company will take its place as an important repair plant as well as a leading shipbuilding yard.

It has been the aim of the founders of this plant



General view of the Ames plant showing the grouping of buildings and one corner of the building-ways.

A corner in the well equipped pattern-shop at the Ames plant.

to make it complete in every respect, both engines and boilers for the vessels under construction being built at the yard as well as the hulls. The machine shop, blacksmith shop and boiler shop are housed under one roof, 460 feet long by 100 feet wide, and the plate shop is 90 by 360 feet in extent. The carpenter, pattern and joiner shops are grouped in one building with a mold loft, having a clear floor 75 by 300 feet overhead. Other structures on the property are the store room, coppersmith shop, power house, boiler house, office building and gate house. As might be expected in the very latest large steel shipbuilding plant on the coast, the outfit of tools of all capacities embraces the very latest ideas of the leading tool makers of the United States.

The handling of material at the Ames plant follows the modern shipyard trend. Over the ways there is a complete trolley system, the hoists operating separately or in unison, giving a wide range in handling capacity. The shops are fitted with traveling cranes and the usual individual jib crane service to the heavy tools. A complete system of broad-gauge railroad tracks and locomotive cranes solve the problem of miscellaneous material handling about the yard and between the shops.

In the matter of employee welfare, nothing has been left undone. A splendidly equipped hospital

Portable electric reaming tool at work.

Laying out keel-blocks and building-ways, showing the overhead trolley handling system employed in handling material.

has been erected inside the works and a trained nurse and a doctor are always at hand. A large restaurant, 55 by 120 feet in size, is another feature which illustrates the determination of the management of the Ames Shipbuilding and Dry Dock Company to furnish every convenience and comfort for their employees as well as taking every precaution to cut down accidents to workmen to the lowest minimum.

THE ALBINA ENGINE AND MACHINE WORKS INC.

This concern is one of Portland's new steel shipbuilding plants, and while work on the plant itself and also on the vessels under contract has been somewhat delayed owing to difficulties in obtaining quick delivery of both equipment and material, the situation in this respect has improved greatly during the past few weeks and the yard is now forging ahead.

The ways and machine-shop looking north, Albina plant.

The Albina Engine and Machine Works has six steamers under contract for Norwegian interests, two of them being 261 feet long by 43 feet 5 inches beam by 20 feet moulded depth with engines 20, 33 and 54 inches cylinder diameters, 1200 horse power and steam furnished by two Scotch boilers.

The other four vessels are to be 300 feet long by 44 feet beam by 21 feet 5 inches moulded depth, driven by triple expansion engines with 23, 36 and 60-inch cylinders, 1400 horse power, and steam furnished by two Scotch boilers.

General View of the Albina Engine and Machine Works Shipyard.

View looking south, showing trolley masts and locomotive crane in the foreground.

C. F. BRAUN AND CO.

This firm formally opened its new factory building on Folsom street, between Third and Fourth streets, San Francisco, on the 15th of April. The shop is a modern, reinforced concrete structure, fitted with modern, motor-driven tools and an extensive line of Braun specialties will be turned out for the Western trade.

Mr. William H. Todd, head of one of the foremost combinations of shipbuilding and ship repairing plants in the United States, was a visitor to the Pacific Coast during the early part of April. Mr. Todd visited Tacoma, Seattle, San Francisco and other points and predicted still further contracts for the Seattle Construction and Dry Dock Company and his new Tacoma yard.

Mr. Frank Waterhouse, the head of a great Seattle exporting and importing institution.

A Founder of Seattle's Foreign Trade

The remarkable strides in foreign trade achieved by Seattle and other Puget Sound ports during the past few years and the large number of shipping and foreign trade commercial houses now having headquarters or branches in the Great Northwest section of the Pacific Coast naturally directs attention to the few men who pioneers Seattle's commercial deevlopment, and among these, none played a more important or more daring part than Mr. Frank Waterhouse. Indeed it may justly be said that the efforts of Mr. Waterhouse and a few others paved the way for changing the status of Puget Sound from a provincial arm of the sea to one of the centers of ocean borne commerce known to and seriously considered by every international trader the world over.

In reaching out for business, buying a cargo here and there and taking chances that few cared to follow, Waterhouse blazed the way until the people of Seattle began to fully realize that the city's hopes for a really great future lay on the seas and Seattle began to make marvelous gains in population, wealth and commerce. Today the firm of Frank Waterhouse & Co. carries on a business practically all over the world. With head offices in Seattle and branches in Vancouver and Victoria, British Columbia, Portland, Tacoma and San Francisco on the Pacific Coast of the United States and New York in the East they carry on a vast shipping, commission and warehousing business, operate docks and coaling plants; have a literage business; a coasting freight service; operate lines of steamers from Puget Sound, British Columbia and San Francisco to Vladivostok, Japan, China, Manila and the Strait Settlements.

General view of the St. Helens Shipbuilding Company, St. Helens, Oregon.

The Pioneer Motorship Builders

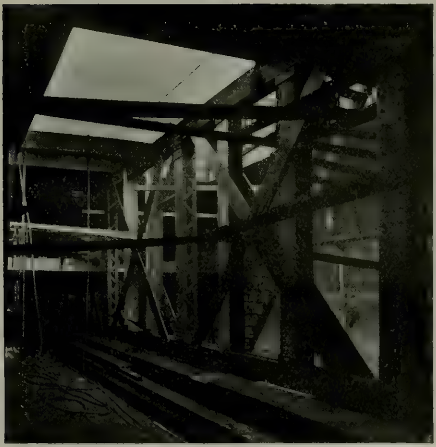
NOW that the internal combustion engine has taken a definite place on the Pacific Coast both in full-powered and auxiliary vessels and can no longer be numbered among the "experiments," it is a satisfaction to note that it took but a very short space of time to overcome the prejudices held by many shipowners and engineers and that the waters of our own Pacific will probably witness as marked advances in the use of this method of ship propulsion as shall occur in any other quarter of the globe.

To the St. Helens Shipbuilding Company, one of the interests operated by the Chas. R. McCormick Co., belongs the credit of pioneering the way for the present development of the internal combustion engine for marine propulsion on the Pacific Coast. The St. Helens Shipbuilding Company has been in operation for over six years, the McCormicks having originally leased the famous Bendixen yard, recently taken over by the newly formed Rolph Shipbuilding Company, and later moving to their present location on an island in the Willamette river opposite the town of St. Helens, Or.

There are several points in connection with the location and ownership of the St. Helens yard that are worthy of note. This plant utilizes McCormick timber. This timber is being cut but a scant ten miles away from the ship yard and as the supply is practically unlimited, careful selection for shipbuilding purposes is possible without in any way interfering with the regular lumber business of the McCormick Company. Again, the St. Helens yard has unlimited room for expansion and in this connection tentative plans have been outlined for the laying down of fifteen building ways in case the yard is called upon for the construction of a large number of the big fleet of wooden carriers proposed by the Federal Shipping Board to counteract the wholesale destruction of tonnage by German submarines. Logs are delivered at the river bank and drifted down to the shipyard where they will be picked up by a locomotive crane and transported over an extensive system of tracks to any point in the ship yard where they may be desired. The plant is equipped with the most modern wood working machintry and can be readily expanded into the greatest wood sbipbuilding plant in the world.

When the Chas. R. McCormick Company undertook the construction of the "City of Portland" a large number of men whose opinions were well worth considering were skeptical of the results. These forebodings were not only directed towards the radical departure in propulsive power, but also as to the ability of such a large single-decked ves-

The building-ways at St. Helens, with one vessel ready for launching and two in frame.



The Howe truss on the center-line of the "City of Portland." This truss is fitted to compensate for excessive ratio of length to depth of hold.

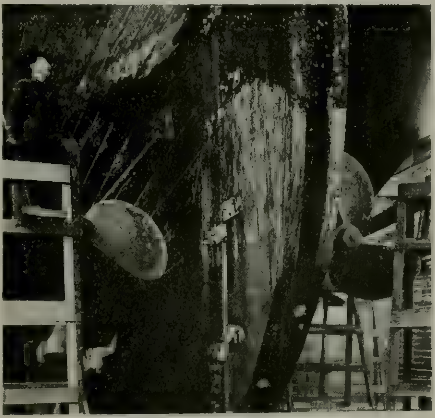
sel standing up under the extremely trying conditions as to loading under which the western lumber-carrying craft works. The results obtained, however, have fully vindicated the judgment of the Charles R. McCormick Company and the St. Helens Shipbuilding Company. The "City of Portland" is a five-masted schooner in rig, 278 feet long over all, 250 feet between perpendiculars, 48 feet beam and 19 feet depth of hold. Her cargo handling appliances follow the usual practice for such craft on the Pacific Coast. She has a capacity for 2,000,000 feet of lumber and has already made long voyages with over this amount of timber on board. She is fitted with twin screws driven by two 320-horsepower Bolinder engines, and her deck machinery is operated by steam from an oil-fired donkey boiler. As there was grave danger of "hogging" in a wooden vessel of such unusual length for her depth of hold, a Howe truss was provided along the center line to add to the girder strength of the vessel. This truss, as will be noted from the accompanying photograph, is of open construction and does not unduly interfere with the stowage of lumber below deck. A recent drydocking of this vessel after traveling 21,000 miles and laying three months in Australian waters waiting for a coal cargo (there being a coal miners' strike on in Australia at that time), revealed the hull to be in splendid condition. The heavy marine growth shown in the drydock picture herewith was picked up during her forced idleness and partially explains her rather slow passage from Australasian waters.

Having thoroughly demonstrated that she no longer need be considered as an experiment as far as the reliability of her power-plant was concerned, and also that no kinks were liable to develop in her shear, the only question remaining was that concerning the best method of routing an auxiliary ship. This question is still rather open to discussion and sufficient data has not yet been collected on the off-shore voyage performances of auxiliary craft to clearly demonstrate whether economy lies in following the customary sailing ship routes in search of a fair wind or running on the steamship lanes and using the engines practically if not all the time.

In short, the problem has simmered down, as far as the auxiliary powered vessel is concerned, to whether it is best to utilize the engine as an auxiliary power to the sails or utilize the sails as an auxiliary power to the engines. The experience so far with the "City of Portland" seems to indicate that the latter course will prove the more economical.

The work of the McCormick interests in pioneering the way for a new type of carrier has been of untold benefit, not only to the manufacturers of internal-combustion engines both in America and abroad, but also to the wooden shipbuilders on the Pacific Coast, as it seems reasonable to suppose that the wooden ship of medium tonnage powered with some type of low fuel consumption motor and fitted with economical deck machinery, will have a permanent place in the merchant marine of the Pacific that even the return of steel tonnage to normal cost of production will not seriously affect.

In any case, the experience with the "City of Portland" demonstrates that her owners are satisfied with the results, as their building programme has embraced sister ships and even slightly larger vessels of the same type.



The stern of the "City of Portland" in drydock after traveling 21,000 miles and laying in tropical waters for several months.

Big Willamette Plant Busy

THE great demand for new tonnage naturally flooded boiler shops with orders and so great has been the demand for steam generators that makers of every type of boiler have found themselves hard pressed to keep abreast of their orders.

Among the concerns early affected by the sudden demand for marine boilers was the Willamette Iron and Steel Works of Portland, Oregon. The principal output of the plate working branch of this business consisted in penstocks, tanks and stationary boilers, but the shops were splendidly equipped and the change in the character of the principal output was accomplished smoothly and without loss of efficiency or high character of the work performed.

During the past year the Willamette Iron and Steel Works, at Portland, Oregon, have reconstructed their boiler shop, and have installed much new equipment, so that they have the most modernly equipped plant for the building of marine and stationary boilers on the Pacific Coast, and their facilities rank with any in the country.

The entire dock property of the company has been used for the boiler shop. This includes one main erecting bay 50 by 300 feet, served by a 20-ton Pawling & Harnischfeger crane.

The machine tool bay is also 50 by 300 feet and is served by a 10-ton crane. In this bay are installed two high speed radial drills—one No. 3 Hilles & Jones plate planer, with a capacity for planing 1½ inch plate, one set of bending rolls capable of rolling 1½ inch plate 13 feet wide, two 150-ton universal flange press with four open oil forges and one large oil fired annealing oven with bending slabs.

Adjoining this bay is a similar bay 50 by 300 feet long, served by a 3-ton high speed Shaw electric crane. In this bay are assembled numerous punches, drills, cut-offs saws, bending flanges and similar equipment.

In addition to this bay and parallel to it is another 50 by 500 foot bay served with a 3-ton Shaw crane. This bay is used primarily for light sheet metal erecting work, such as fuel oil tanks, uptakes, breechings, stacks, etc.

In a separate tower adjoining the main erecting bay, with suitable overhead gear for handling 25 tons, are located two hydraulic bull riveters with a gap of 12 feet.

A broad-gauge industrial track passes through the erecting bay and connects directly with the shear legs. A special underslung car of 200,000 lbs. capacity is used to transfer boilers from the erecting bay to the shear legs. The shear legs have been entirely reconstructed by the erection of a permanent mast and the installation of a modern electric hoist, so that they now have a capacity of 60 tons.

It will be seen from the above description that the equipment of this boiler plant is of very high order, making it possible to handle any class of plate work, particularly marine boiler work, in a rapid and economical manner.

This large investment was made desirable from the present tremendous demand for Scotch marine boilers on the Pacific Coast.

Up to two years ago the Willamette Company's plate department had concerned itself more with the construction of hydro-electric penstocks and draft tubes, together with stationary boilers and all character of tanks.

The new equipment, added to the old facilities, now enables them to handle plate up to 1⅝ inch thick.

We are informed by representatives of the company that the present volume of business on hand is sufficient to operate the plant at full capacity for a period of nearly two years. The principal tonnage at this time is composed of Scotch marine boilers of particularly large size. They have 60 such boilers under order for shipbuilding concerns in Seattle, Portland, San Francisco and other points on the coast.

In addition to these boilers they are constructing a large number of pulp digesters, and have recently received a contract from the Stone & Webster Corporation for a high pressure penstock.

Although the amount of tonnage to be handled during the next eighteen months is large, we have been informed that they are prepared to take on additional tonnage and make rather prompt delivery.

On March 27, the Peninsula Shipbuilding Company of Portland launched the Diesel engined four-masted schooner "Beta." The vessel is 251 feet long over all by 43 feet 4 inches beam by 23 feet 6 inches depth. She is of 2600 tons dw. capacity and will be fitted with 600 horsepower in Winton Diesel engines. She has fuel tank capacity of 1600 barrels and deck machinery will be operated by steam furnished by an upright marine boiler of 1100 square feet heating surface carrying 150 pounds pressure.

Kruse & Banks of North Bend, Or., launched the lumber carrier "Johanna Smith," to the order of the Inter-ocean Transportation Company, on April 7. The vessel is 266 feet long by 49 feet 11 inches beam by 14 feet depth of hold.

Launch of the "Margaret Haney" at the Cameron-Genoa Mills Shipbuilders Ltd. of Victoria, B. C.

CANADIAN YARD FORGING AHEAD

The Cameron-Genoa Mills Shipbuilders Ltd., with offices at Victoria and shipyard at Point Ellice, British Columbia, are making splendid progress on the fleet of wooden motor ships they have under order.

This concern is laid out upon the assumption of the construction of four ships at one time and the equipment of the plant is very complete, comprising a large rigging loft, paint shop, supply houses and stores, office building, blacksmith shop, joiner shop, finishing shop and a finely equipped saw mill. Mr. B. F. Fitch, a well-known shipbuilder, is general manager of the yard.

The Cameron-Genoa Mills Shipbuilders Ltd. received an order for six vessels from H. W. Brown and Company of Vancouver and four of these are yet to be completed. They are five-masted auxiliary schooners with internal-combustion engines capable of giving them about an eight-knot sea speed. These ships are designed by and are being built under the personal supervision of Mr. J. R. Price, widely known up and down the coast as a master builder and designer. Mr. Price is President of the company, Mr. B. F. Fitch, General Manager, Mr. T. R. Enderby, Treasurer, and Mr. G. Furness, Assistant Treasurer.

H. W. Brown and Company have six additional ships, of the same class of those at the Cameron-Genoa Mills Shipbuilders, now under construction at the Wallace Shipyards, North Vancouver.

The Pacific Coast Company has finally disposed of the steamer "Congress." The China Mail Steamship Company has purchased the vessel and will have her refitted for the trans-Pacific trade. The "Congress" is 442 feet 8 inches in length, 54 feet 9 inches beam and had a deadweight capacity of about 5,500 tons and accommodations for over four hundred first-class passengers. Her oil tank capacity is sufficient for the trans-Pacific run and she will probably prove quite a success on her new route.

The "Margaret Haney" rigged and ready for sea.

The "Laurel Whalen" ready for launching at the yards of the Cameron-Genoa Mills Shipbuilders Ltd.

The "Maui" steaming down San Francisco Bay on the start of her maiden voyage to Honolulu.

The "Maui" Our Latest Pacific Liner

THE leading maritime event of the past month on the West Coast was the trial and maiden sailing of the Matson Navigation Company's new steamer "Maui." This distinction belongs to the "Maui" as the largest passenger vessel ever constructed on the Pacific Coast and also as the largest geared turbine commercial installation. The hull of the steamer was fully described in the February, 1916, issue of the Pacific Marine Review and the engine installation in the March, 1917, issue of our journal. She was given a series of standardization trials on the mile course off California City on April third and set out for Honolulu on her maiden voyage on April seventh.

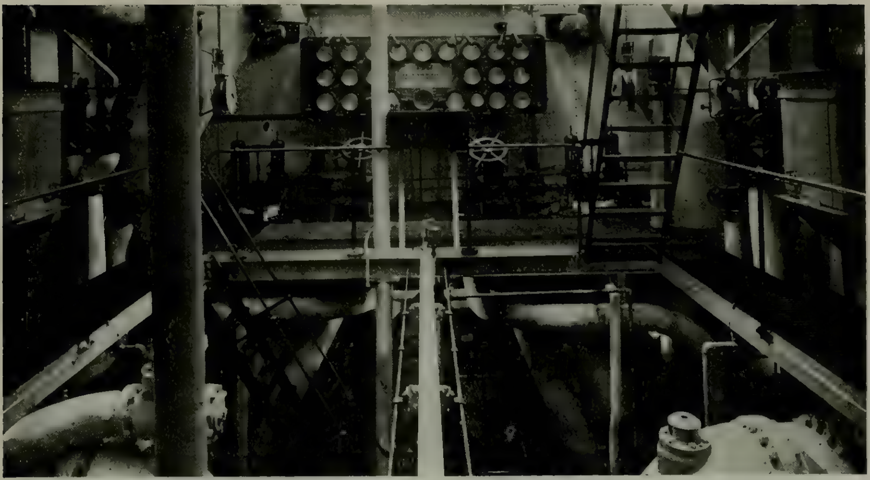
The "Maui" is 501 feet 2 inches long over all, 484 feet between perpendiculars, 58 feet moulded beam, 44 feet 9 inches moulded depth to shelter deck and her displacement is 17,430 tons at 30 feet mean draft.

The "Maui" is constructed entirely of steel to the highest class at Lloyd's and has three complete steel decks with a promenade deck extending from aft for two-thirds of her length. She has three steel masts and is fitted with heavy cargo tackle and a special 50-ton boom on the foremast, serving number two hold. Below the main deck and forward of the engine and boiler rooms the hull is divided by transverse watertight bulkheads into six compartments as follows: From the stem to frame 16 is the forward peak tank; from frame 16 to frame 46 is Number 1 hold in which is fitted an oil tight orlop deck and the depth of the double bottom is reduced, forming a deep fuel oil tank; number two hold extends from frame 46 to frame 80 and from the forward bulkhead of this hold to the after peak bulkhead the double bottom is continuous with a depth of 5 feet 6 inches. Numbers one and two holds are served with overall hatches through the main, upper and shelter decks. Between number 2 and number 3 hold and extending from frame 80 to frame 90 and from the inner bottom to the main deck is a deep tank fitted for the carriage of either fuel oil or molasses in bulk. The pumps for handling this liquid cargo are located immediately aft of the tank in an enclosed space in No. 3 hold. No. 3 hold extends from frame 90 to frame 118 and No. 4 hold from frame 118 to the forward boiler room bulkhead on frame 142. These two holds are served from overall hatches trunked through the passenger accommodations from the promenade or boat deck. There are four cargo ports on each side serving the 'tween decks and one on each side between the upper and shelter decks serving the large upper 'tween deck cargo space. There is also the accommodation port on each side at the ends of the thwartship passage on the upper deck between the boiler room casing and the galley, permitting easy access to and from the store rooms and refrigerating compartments for steward's stores, etc. Further cargo space is secured in the boiler room wings between the main and upper decks and on top of the settling tanks.

The cargo handling equipment consists of eight Murray winches serving the holds and 'tween decks through hatches 20 feet 3 inches by 16 and 21 by 16 feet for Nos. 1 and 2 holds and 14 by 12 and 18 by 15 feet for Nos. 3 and 4. Wing hatches are fitted in the 'tween decks to facilitate the handling of cargo.

The boiler room extends from frame 142 to frame 171 and is fitted with eight Babcock and Wilcox water tube marine boilers, working at 265 pounds pressure and 50 degrees F. superheat. The boilers have a heating surface of 30,100 square feet and a superheating surface of 3,520 square feet. The oil-burning system is the Union Iron Works Dahl type. The boilers are set athwartship with a common fire room fore and aft on the center line of the ship. At the back of the boilers are large settling tanks.

The engine room, including the engineers' work shop and tool room extends from frame 171 to frame 200, the main deck wings accommodating

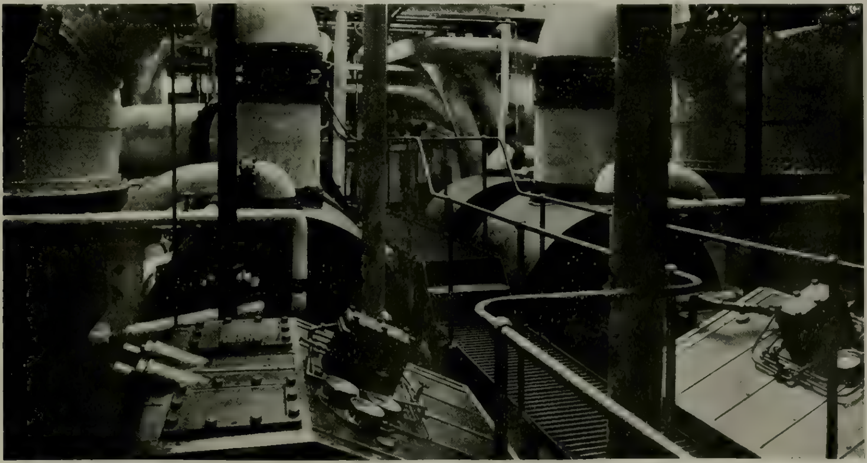


Upper engine-room gratings, showing gauge board and control wheels. The three Brunswick refrigerating machines are located in the port wing on this level and the electric plant is on the starboard side.

the electric light plant on the starboard and the refrigerating plant on the port side. The propelling machinery consists of Westinghouse impulse-reaction, cross-compound turbines with double pinion reduction gear, delivering 5,000 h.p. for each shaft. A complete description of this machinery by W. W. Smith, M. E., of the Westinghouse Machine Company, appeared in the March, 1917, issue of the "Pacific Marine Review." Among the notable engine room equipment is a 25 tons per diem Reilly evaporator.

The refrigeration plant on the "Maui" is very complete and extensive, there being three 10-ton compressors, supplied by the Brunswick Refrigerating Company. In addition to the usual galley and pantry refrigerators, there is a large nest of refrigerating compartments on the main deck, extending from frame 61 to frame 99, a distance of 85 feet and having a width of about thirty feet. The apartments are grouped around a handling room, which is reached by a stairway from the saloon pantry. In the group are separate rooms for vegetables, meat, fish, steward's stores, poultry, eggs, butter and milk. At the after end of the group, the service refrigerating compartments for the steward's department are located and forward of these, with connecting doors leading to the 'tween deck space, are the larger rooms for refrigerated cargo.

The electric light and power plant consists of two 30 and one 50 k.w. General Electric direct-connected dynamo sets, supplying direct current at 110 volts. A liberal use is made of electricity for heating as well as for lighting purposes.



Top of the turbines and reduction-gear casings on the steamer "Maui," showing steam and exhaust piping.

One feature of the dining salon is the wide spacing of tables, and the effect of spaciousness has been increased by the use of "Nevasplit" panels, enabling the very large flat ceiling panels shown in this picture.

The anchor windlass is of the Hyde type and is located on the shelter deck, the engine being on the upper deck below. The steering engine is located right aft on the upper deck and is fitted with Brown telemotor control from the bridge.

Accommodations for the sailors, boatswain, quartermasters and carpenter are located forward on the upper deck, while mess rooms and steward's and engineer's crew quarters are on the upper deck in the way of and aft of the engine room hatch casing. Lavatories, mess rooms and sleeping quarters for a limited number of third-class passengers are grouped on the upper deck in the way of the boiler room casing.

Passenger Accommodations

Generally speaking, the passenger accommodations on the "Maui" closely follow those on the Matson steamer "Matsonia," there being, however, several notable alterations, among which is the extension of the flying bridge house to accommodate a fine set of bachelor rooms, referred to generally by friends of the company as the Roth addition, that genial gentleman having conceived the idea that some extra concessions were coming to the bachelor as a compensation for his lonely lot. In the interior finish of the public and many of the special staterooms, the "Maui" has set a very high mark for any successor and some splendid taste has been displayed in the choosing of her furnishings.

Roughly speaking, the first-class passenger accommodations occupy the upper deck from the galley to abreast number two hatch. This space being occupied by double-banked staterooms, the inner rooms having light and air shafts extending to the boat deck, and the main dining saloon. Four deck houses on the shelter deck, containing social hall, writing room, ladies' room, lobby and first-class staterooms and suites. These houses are separated by narrow passages only and give the effect of a single deck house. Aft of the engine room hatch on the shelter deck is another deck house, containing the quarters for the engineering officers and a roomy hospital. The boat or promenade deck has one large house, containing the smoking room, bar, lavatory and special staterooms. Further aft on this deck is the wireless office. The boating arrangement consists of nine standard metallic lifeboats certified for fifty persons each, one wooden powered lifeboat and a workboat, all under Welin quadrant davits. The boat deck is roomy and free from obstructions, offering a splendid promenade space. On the flying bridge is located the Captain and deck officers' accommodations and the group of bachelor rooms already referred to.

The Flying Bridge

The house on the flying bridge is occupied by the Captain's office, stateroom and bath, these rooms being finished in mahogany. These quarters occupy the full width of the deck house and are very commodious. Aft of the Captain's rooms are the

The main dining salon is one of the features of the ship; the large "false" windows inside the ports add a special charm to this spacious room.

staterooms for the four deck officers, a bath and toilet with a separate entrance being provided also for their use. To the aft of the deck officers' quarters are two special staterooms with baths attached and fitted with two brass beds. Then follows eight bachelor rooms fitted with a single brass bed each. These rooms are in two groups of four each and each group is provided with a bath. The after end of the house is occupied by two large rooms fitted with twin beds and with private baths attached. This makes a total of twelve passenger staterooms on this deck fitted with sixteen brass beds and served by six baths. The idea of bachelor apartments on the Hawaiian run arose through the great demand for special accommodations of this character, the Matson Navigation Company finding that there are not enough special accommodations on their other ships to meet the demand.

The Boat Deck

As usual in passenger vessels, the smoking room occupies the forward end of the boat deck house. This room is finished in quartered oak and is a very handsome piece of joiner work. It is lighted by narrow paned cathedral type windows and an ornamental glass skylight. Snug alcoves are built in on the sides of the smoke room, while the feature of the forward bulkhead is a beautifully executed Hawaiian coat-of-arms over the mantel of the electric fireplace. Aft of the smoking room on the port side is a buffet bar and on the starboard side the men's lavatory and toilet. Aft of the smoking room there are six special suite rooms, each with private bath. Two of these rooms, in the way of the grand stairway lobby, are very long and have two beds, fore and aft of each other. These rooms are finished in Koa wood, birdseye maple and mahogany, with trim and furnishings to match in each case. There are five more staterooms in this house, these being fitted with upper and lower berths. These five rooms are served by two baths, access to which is had without going outside on deck. Further aft on the boat deck is a well arranged ship's office, with a large safe and a comfortable lobby for passengers having business with the purser. The purser's stateroom and quarters for two wireless operators are arranged for in the same enclosure. The boat deck gives a wide and lengthy promenade with plenty of wide, clear spaces for dancing and deck games.

Shelter Deck

The shelter deck is the chief passenger deck on the "Maui," there being a range of five deck houses, the first four being separated only by narrow passages and forming one house as far as outer appearances show. The forward house on this deck is largely taken up by the social hall, writing room, ladies' lounge and the lobby around the grand stairway. The social hall extends the full width of the house and is lighted by large square windows. The woodwork is mahogany finished to a dark rich tone, the effect being relieved by the use of very large "Nevasplit" panels of a light cream color.

The beaming on the ceiling is heavy but very widely spaced, giving the advantage of extremely large flat ceiling panels, which are set off by light mahogany stiles. The furnishing is in keeping with the room, being very rich and heavy in greens and deep greys. Aft of the social hall on the port side is the ladies' lounge and on the starboard side the writing room. These rooms are on the forward side of the lobby and off the after side of the lobby is the doctor's stateroom and the maids' room. There are four special rooms in this house, each with a private bath, fitted with twin brass bedsteads and two regular staterooms with a bath between them, this bath also being accessible from the deck outside. The second house on the shelter deck consists of ten staterooms and four baths grouped around the hatch casing to number three hold. The rooms are so arranged that each one has a private entrance to a bath room and the bath rooms can be reached from the deck also. The third deck house contains fourteen two-berth staterooms and four baths grouped around the hatch casing to number 4 hold and is arranged in the same manner as the house forward of it, each room having a private entrance to a bath room. The after stairs leading to the accommodations on the upper deck are also in this enclosure. The fourth house on the shelter deck contains twelve staterooms, two baths and the barber shop grouped around the forward end and the sides of the boiler room casing. The fifth house is located aft of the engine room casing and contains the chief engineer's stateroom and office, the stairs leading to the engine room, quarters for the first and second assistant engineers and freight clerks and an airy hospital and dispensary storeroom.

Upper Deck

The upper deck staterooms for first-class passengers are all located amidships aft of the dining room and consist of a double tier of staterooms, thirty-three in all, the inner rooms having special light and air shafts. Access is had to these rooms either through the grand stairway aft or from the after stairway to the shelter deck. Two batteries of lavatories and eight baths at the after end of the passenger gangways on this deck serve these thirty-three staterooms. The Chief Steward's room is also located on this deck. The main dining saloon is located aft of number two hatch on this deck and has a seating capacity of 254 persons at tables accommodating two, six, eight or nine persons. The grand stairway lands in a broad enclosed vestibule, from which the dining saloon is entered. The room is finished in mahogany with beveled beams overhead and very large panels of "Nevasplit," relieved with narrow mahogany stiles. The lighting is carried out with large false windows inside the side ports, while the artificial lighting is by means of clusters inside large ceilng globes, giving a soft, rich effect throughout the room. Aft of the dining room and along the center line of the ship is the saloon pantry with large ice box, steam table, batteries of tea, coffee and milk urns, etc. A separate passageway connects the pantry with the galley, which extends the full width of the ship and is fitted with the most modern outfit in the way of steam cookers, ranges, stock kettles, charcoal grill, etc.

One of the special rooms on the shelter deck. A feature of the "Maui's" passenger accommodations is the large number of staterooms fitted with brass beds instead of berths.

The "Roth Addition," bachelor apartments on the bridge of the new Matson liner "Maui."

Developing the Motor Lumber Carrier

By D. W. and R. Z. Dickie

EXPERIENCES so far with motor ships that have been built and placed in service on the Pacific Coast indicate that, like all vessels, no matter how up to date they are believed to be at the time of building, they are still open to improvement and development. Lack of quiet, concentrated thought has been the cause of most of the apparent short-comings.

The accompanying outline sketches indicate at a glance what the future has in stock for the ship owner of lumber carrying vessels. The vessels are about 218 feet long, and except for the shape of the hull are of the type of lumber carrier which has been successfully developed on the Pacific Coast. The carrying capacity is about 1200M feet of pine, and the new features embodied in the sketches are in the motor power and the cargo handling machinery. The engine is a Dow 8 cyl. full Diesel marine engine, 15-inch bore, and 22⅛-inch stroke, four cycle, delivering 670 break horse power at 220 revolutions per minute, and is equipped with a reduction gear giving a propeller speed of 88 revolutions, to obtain high propulsive efficiency, a small diameter propeller not being successful when the vessel is bucking a head wind.

In many cases these plants will be handled from the start by men who have handled steam plants and just so far as the bearings and working parts of these engines resemble the type of engine to which they have been accustomed, the easier it will be for them to adapt themselves to handling this type of motive power.

The reason for the bearing troubles that have happened to date is the use of unsuitable lubricating oil. These plants should use lubricating oil of that viscosity and flash test found by experiment to be best suited to the parts to be lubricated. Every motor ship has started out with a different kind of lubricating oil, and the experiments have been costly to the owners.

The ordinary oil that is used in the bearings of a steam engine will break down completely when subjected to the action of heat, and will separate into about 50% of lubricant and 50% of sediment.

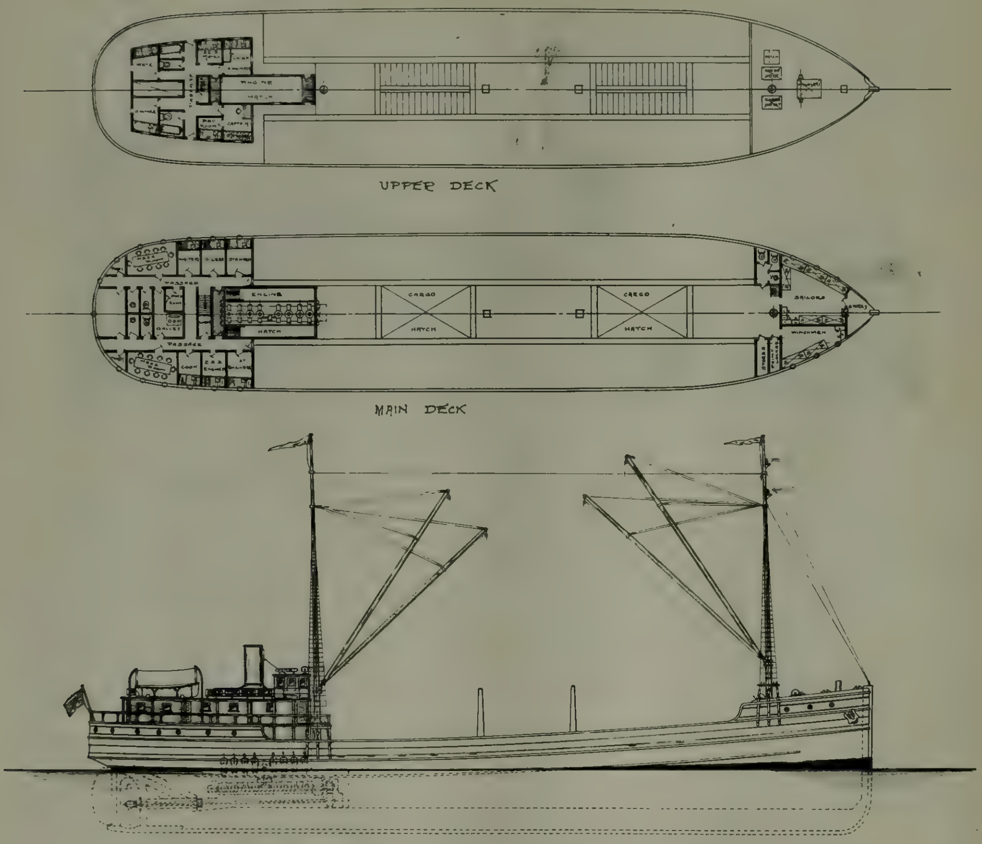
This is especially true in engines of the Semi-Diesel type, where the crank pins and cross-heads are enclosed, and are subject to high working temperatures.

The oil is caught in a pan below the engine, filtered and used over again with about 50% of new oil used for make up. It has been found best to use a lubricating oil which is made from paraffine base crude when using fuel-oil from an asphaltum base, and visa-versa.

Putting in a reduction gear of required ratio will permit a propeller which will give high efficiency and a suitable size for the vessel in which it is installed.

The object is to combine an efficient power producing plant with an efficient propeller, and at the same time to use a commercial engine with cylinders and parts of standard sizes, each one of the cylinders being a unit in itself, with all spare parts interchangeable.

In this way the engine can be designed to run at its most efficient speed, the cylinders kept small and easy to handle, and the first cost of upkeep reduced and to get the speed of the propeller down to 88 revolutions per minute, the most economical speed for this particular ship, it is necessary to use a 2½ to 1 reduction gear. The gear sketched in is the one furnished by the Industrial Equipment Co. of San Francisco, and is designed to bolt on to the after end of the engine with a ball-bearing thrust block on the front end of the intermediate shaft.



Proposed two-decked general cargo and lumber carrier with engines placed aft.

The crank shaft will be 8″ diameter, the intermediate shaft 10⅞″ diameter and the propeller shaft 12¼″ diameter, using a propeller 11′ 3″ diameter.

In the single ended vessel the intermediate shaft is carried forward to the front end of the engine to the reduction gear and then the engine is placed aft of the reduction gear.

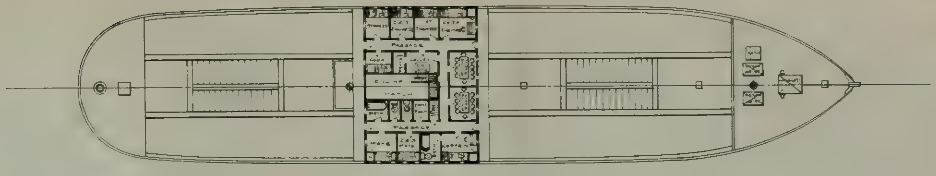
The reduction gear is fitted with quill bearings above and below, so the short piece of shaft on the engine will have a chance to move a little without injury. On the lower shaft the quill is made large enough to draw the intermediate and tail shafts through the center. This also has the advantage that the thrust can be mounted on the quill and does not have to be disturbed when the tail shaft is drawn. Also the thrust bearing can be examined without disturbing the intermediate shaft. A loose coupling can be fitted on the forward end of the quill to take up any movement of the shaft due to different loadings of the vessel. This is of more than passing importance when the fact is taken into account that the new single ended lumber schooners that have been built lately have hogged from 2″ to 8″ before and after the first trip with lumber.

The engine is kept far enough forward to allow space for the examination of the thrust bearing. The installation otherwise follows the standard Diesel practice.

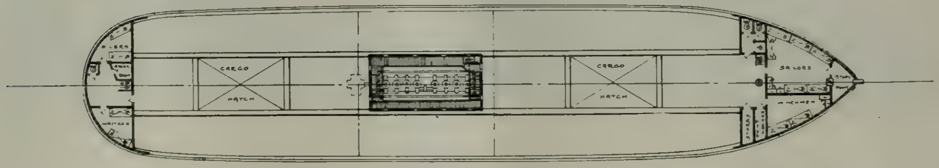
The sketch showing the engine amidships has the thrust bearing on the after end with the thrust arranged in the same manner as the other vessel. the thrust is kept far enough aft of the engine to permit of attention and care.

The power for the winches is generated by means of a Diesel or Semi-Diesel engine in the engine room, and is handled by the same crew. The Firemen's Union insist that if a donkey boiler is used for the winches that the ship shall carry a donkeyman. The steam donkey boiler with the oil-burning plant, piping, winches and all connecting gear, including the extra oil tanks, cost about the same as the electric installation at the present writing.

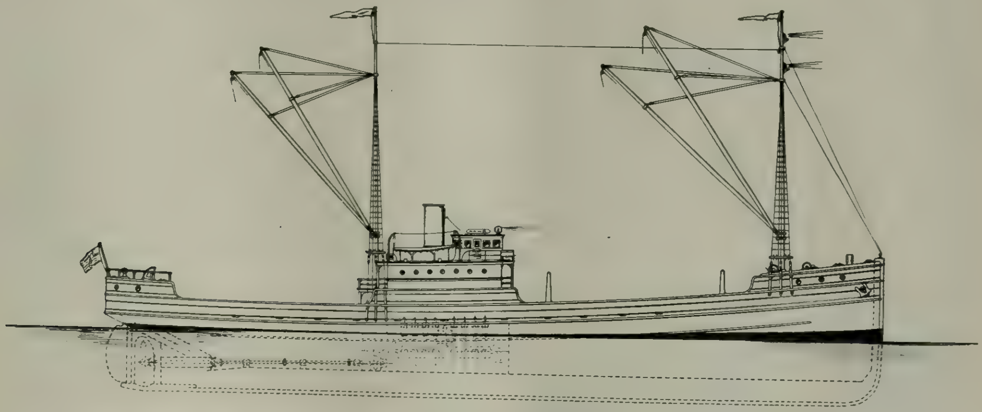
The winches, steering gear, and anchor wind-



UPPER DECK



MAIN DECK



The same hull with engines amidship. The feature of these designs is the provision for gearing down the Diesel-engine drive to 88 revolutions on the propellers.

lass should all be handled electrically, doing away with the donkey boiler, oil and water tanks, and contingent auxiliaries. In a great many cases men that are very capable of handling an internal-combustion engine make a failure of handling a steam plant.

The success of the steam winches on this coast has probably been due to the fact that they have been operated by one of the main boilers of the vessel, and the question of economy has been overlooked, although in a vessel operating coastwise this could be made a point of greater saving, owing to the greater part of the time of the vessel being spent loading and discharging.

In cases where a donkey boiler has been installed it has been found that even a large donkey boiler is inadequate to supply steam to the present uneconomical steam winch, and the situation has only been saved by using the main boiler for this purpose.

Electric winches are very much cheaper to operate, requiring no firemen and very much less fuel. Also there are no steam pipes to rot on deck.

The electric winches have been worked out by the Lidgerwood Winch Manufacturing Co., represented by the Norman B. Livermore & Co. of San Francisco with a 65 and a 50 horse power motor on the large and small sizes.

The Pacific Machine Shop & Manufacturing Co.'s electric winches installed on the motor ship "Astoria" of the A. O. Anderson Co., have proven so successful for the handling of cargoes, and have been so highly spoken of by the owners and stevedores loading the vessel that it is only a short time when the steam winch will be superseded by the electric winch, as there is a very large saving in the cost of fuel in the handling of cargoes.

The winches on the "Astoria" were fitted with 15 h.p. motors, and by adapting a 25 or 30 h.p. motor to these winches for coast work, it has been clearly shown that they will handle lumber in a more efficient manner than the steam winch.

The W. J. Jones Stevedoring Co. of Portland, who loaded the "Astoria," say that these are the first electric winches they have operated and from their experience they seem to be better than steam winches.

For off-shore work the small power winch probably would be sufficient, but for the lumber trade in order to compete with the steam winches, more power should be fitted.

The steering gear is arranged with a motor connected with a friction clutch, which can be thrown in to run either to starboard or port with a lever. From the wheel in the pilot house a rope engages in a groove near the edge of the steering wheel, and in a grooved pulley on the electric steering gear. The motor can be allowed to run all the time, and the clutch just operate the steering gear at the will of the operator. If it is desired, the motor can be fitted with an air piston switch control, which would throw the switch out if the motor was not operated for a minute or so.

The anchor windlass operated electrically is a commercial article and can be bought from the Pacific Machine Shop and Manufacturing Co., or any of the standard windlass builders. Care has to be taken to get the wildcat to pass the shackle of the anchor, as several windlasses have been fitted on the late ships that would not take in the chain when the shackle had to be passed over the wildcat.

Capstans for the after deck can be purchased commercially, fitted to operate electrically.

The fire and bilge pumps and the little electric plant necessary for the lights for the ship at sea are operated by Semi-Diesel engines. For heating the quarters that are not built into the bridge-house, the same wiring that does for the winches can be used for the electric heaters.

The exhaust from the engines can be used to heat water for heaters in the rooms, and for heating bath water.

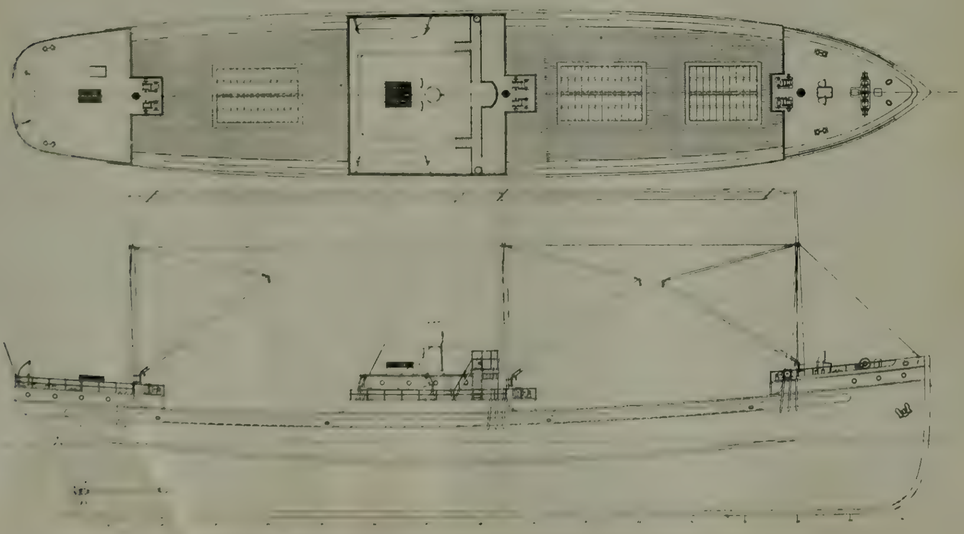
With regard to the hull on this vessel there is no question that with the engines amidships the vessel is much stronger and easier to keep in line. The space occupied by the machinery is less than that required by a steam vessel, leaving more cargo space for lumber.

The principle advantages gained by the use of Diesel motive power are saving in fuel consumption and increased radius of action, also a motor ship that is electrically equipped has a smaller crew than a steam vessel.

Taking the consumption of the steam vessel at 70 bbls. a day, and the motor vessel at 24 bbls. a day, the radius of action with the same fuel tanks would be about 3 to 1, and placing fuel tanks in the space set apart for the boiler in a steam plant, which is not occupied by the motor installation, gives a radius of 12,000 miles for the motor vessel, while the steam plant only carries fuel enough to go 2,200 miles.

At the present writing the cost of the entire power plant installed would be $88,000, and the cost of the hull will be $95,000, and the equipment $22,000.

The complete cost of the vessel ready for sea will be $205,000, with a delivery of about 10 months.



Outboard profile and deck plan of the latest McEachern Ship Company design.

The McEachern Ship Company Plant

Two views at the McEachern Ship Company plant. Left, keel timber. Right, completed masts.

ONE of the best known yards in the Columbia river district is that of the McEachern Ship Company at Astoria, Or. This plant was started in March 1916 and in August of the same year A. O. Andersen & Co., who had then secured a controlling interest in the plant, delegated Mr. George M. McDowell, their Western manager, to improve the plant wherever possible. Mr. McDowell selected Mr. C. A. Coolidge as Superintendent, and under the new regime a blacksmith shop, machine shop, joiner shop, galvanizing plant, draughting room and a track system for locomotive cranes have been installed.

All the timber used in ship construction at the McEachern yard is brought from the Hammond mill by means of barges for the shorter material and by means of rafts for the long material. This is landed onto the slip by means of a yard engine if intended for molding, or by means of a traveling crane if intended for storage or planking and ceiling purposes. After being molded, the timbers are hauled to the No. 2 saw shed where they are sawed to shape, finished on the platform and taken directly to the framing stage down an incline where the frames are assembled and then skidded along the keel and erected in the usual manner.

There is no back motion in any of the operations from the time the timber reaches the machine until it is in place in the vessel for which it is intended.

All material outside of timber, with the exception of the main engines, passes through the store room and is issued to the various hulls as required, the heavier articles being placed under a crane which handles them to the ship ways.

After launching, vessels are towed to the port dock, where the masts are stepped and the engines placed on board and they are then returned to the yard for completion. The vessels leave the plant fully equipped, provisioned and ready for sea, with their classification and other certificates provided.

As a part of the A. O. Andersen & Co.'s Pacific Coast properties, the management of the McEachern Ship Company comes under the jurisdiction of Mr. George M. McDowell. Mr. McDowell has been closely identified with transportation and development matters in the Northwest for over fifteen years. He first sprang into prominence as the right-of-way agent for the Spokane, Portland & Seattle railroad when John F. Stevens was building that system. Mr. McDowell also laid out the right of way for the Oregon Electric, the Hill system which serves the Willamette valley. In 1912 he was appointed agent in Portland for W. R. Grace & Co. and was at the head of that office until March 1916, when he resigned to accept the post of Pacific Coast manager for A. O. Anderson &

Bow framing of a big auxiliary schooner.

Co., a position calling for the handling of wide and varied interests. Besides owning the McEachern Ship Company, A. O. Andersen is heavily interested with Mr. William Cornfoot in the Albina Engine and Machine Works.

Mr. C. A. Coolidge, the assistant Pacific Coast manager of A. O. Andersen & Co. graduated from the civil engineering college of the University of California in 1889. He followed railroad construction work for several years and enlisted as an Army engineer during the Spanish-American war. After the war he entered the public utilities service, remaining till 1907, when he accepted the general managership of the Hill electric line system in the Willamette valley. In 1913 Coolidge joined the Portland office of W. R. Grace & Co. At the time the latter firm withdrew their Portland East Coast service, Coolidge resigned and affiliated himself with the Andersen interests.

The McEachern Ship Company is managed by a carefully selected yard force which includes Mr. B. F. Elofsen, superintendent of construction, who learned his shipbuilding under the Hall Brothers; James A. Allen, general foreman, who spent years with O'Brient Brothers, Kruse & Banks and other well known builders; G. H. Thayer, the chief draftsman, is a Cornell man, and had charge of the drawings for the "Kitsap 1 and 2" for Ballin, also spent five years in the Bremerton navy yard; and E. W. Scott, the purchasing agent, was formerly storekeeper and paymaster for the Alaska Northern Railway.

Of the vessels built and building at this yard, the City of Astoria is on a round trip voyage to Port Pierie with a lumber cargo; the "Margaret" was launched on March 3rd and is now ready for sea, she like the "Astoria" being equipped with twin 240 horsepower Skandia engines. The "Mary" and the "Astri," the latter equipped with twin 320 B. H. P. Bolinder engines, have both been launched. The "May" and hull of No. 6, both of which will be fitted with 320 B. H. P. Bolinder engines will be launched about thirty days apart following the "Astri." Hull No. 7 is half framed and is to be a top-mast schooner with twin 240 B. H. P. Skandia engines as auxiliary power. The keel of hull No. 8 will shortly be laid and four more similar vessels have been authorized. These latter vessels will be full Diesel powered with twin 500 B. H. P. oil engines and will be of 3000 tons dead weight capacity.

Mr. George M. Dowell, who heads the A. O. Andersen & Company interests on the Pacific Coast.

The McEachern plant is on tide water, allowing of launchings at any stage of the river above. The shop equipment of the plant is quite comprehensive for a wooden yard. The blacksmith shop has

A patent planer at work dressing a keelson timber.

four fires and bolt fire, steam hammers and a bolt bulldozer. The machine shop has lathes, drill presses, a shaper, two power hack saws and an oxy-acetylene cutting and welding outfit. There is a large galvanizing plant with pickling and galvanizing tanks. The joiner shop is equipped with double spindle shaper, mortising machine, band saw, bending machine, rip saws, pattern makers' lathes, etc., all pattern work, including propeller patterns, being turned out at the plant.

In the shipyard proper housed in two saw sheds is a jointer, a twenty-four-inch surfacer, a Moran double bevel band saw which is used for planking and ceiling, two American single bevel bands for cutting frames, rip saws, cut-off saws and a dowell machine. A Stetson-Ross shipbuilder's beveling and planing machine is being installed with the expectation of saving thirty days' time on the planking and ceiling of a large ship.

There are three air compressors, two of 250 cubic feet per minute capacity and the third of 125 cubic feet capacity. There are a large number of hammers and yard drills mostly of the Ingersoll Rand and Chicago Pneumatic Tool Company patterns and all the tools in the shops and around the building ways have individual motor drives. For handling heavy material a five-ton crane is provided, this part of the yard equipment having been made in the plant itself.

The Rolph Shipbuilding Company

A DOUBLE interest attaches to the formation of the Rolph Shipbuilding Company. In taking over the old Bendixen yard, the latest California shipbuilding concern has insured the continuance of the oldest wooden shipbuilding establishment in the State and at the same time the entry of the Rolph interests into the shipbuilding field has awakened keen interest all along the coast.

The career of the Bendixen yard is too well known to need repetition here. Established at Fairhaven, Humboldt County, California, about 300 miles north of San Francisco, in 1868, and in practically continuous operation ever since, this plant has turned out in the neighborhood of three hundred hulls.

The property taken over by the Rolph Shipbuilding Company has a water frontage of 1850 feet, practically all of which is suitable for building ways. This long, deep water frontage will enable the concern to undergo great expansion in case it is called upon by the Shipping Board to construct a number of the proposed wooden freighters which are calculated to offset the German submarine menace. At least twelve vessels could be accommodated with building ways if found necessary.

Improvements in the plant machinery and layout are already under way, new tools are being secured, the first section of the yard will be completely decked over and eventually ways will be laid down on both sides of the large saw mill so that this structure will be in the center of the yard proper instead of at one end, as at present.

As soon as the Bendixen yard was secured, the Rolph Shipbuilding Company started a building programme with the following ships, all to their own account: Three steamers of 2500 tons deadweight capacity to be powered with 1000 horse power triple expansion engines to be supplied by the Union Iron Works of San Francisco and operated by steam from Union Iron Works Heine boilers, and one five-masted barkentine with a lumber capacity of 1,650,000 bd. ft. A marine railway is also contemplated so that the plant will be thoroughly fitted for repair work as well as new construction.

The officers of the Rolph Shipbuilding Company are James Rolph Jr., President; D. F. Ewart, Vice-President; John D. Stelling, Secretary and Treasurer; Harry Lewis, office manager; William Russic, formerly with the Hanlon Shipbuilding and Dry Dock Company, foreman shipbuilder, and Charles N. Taylor, chief engineer.

Mr. Julean Arnold, Commercial Attache of the United States in China and Japan, has left for his station after an extended lecture tour of the United States.

Captain George A. White, General Manager of the Hudson River Day Line for a good many years and one of the best known and liked steamboat men in the East, died suddenly on March 15.

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WAR

The declaration of a state of war between this country and Germany has finally brought us face to face with a condition that was inevitable, although put off as long as honor permitted. If we are at war it is our duty to strike and strike as soon as feasible, but it must be evident to all that months of preparation must elapse before any actual warfare, as far as land forces are concerned, can take place. Our duty is plain, unswerving loyalty to the Government and the bending of every effort to the end that when the time comes for the United States to actually participate in the conflict on land as well as on the sea, we will have attained a degree of efficiency and power that will make us both feared and respected by the enemy.

In the opening days of this new war, no industry has shown a finer spirit of Americanism than the shipbuilder. With their yards crowded with profitable private work and orders for new tonnage looming far into the future they have freely offered precedence to Government work. They are cooperating hand and glove with the Government authorities and are giving the lie every day to the vain thought that may be comforting the German military party that this country is not a united one.

The United States has entered the arena with at least one great advantage in her favor. All that the armies and navies of France, Russia, Italy and Great Britain have learned will be ours for the asking; we can profit by their successes and avoid their failures. One of the gravest problems these countries has had to face was that of transportation and its proper division between direct government and private control. This also will prove a difficult problem in this country.

There is the ever present possibility of the Government providing itself transport too far in advance of its actual need. Eventually the Government will commandeer many steamers, but to take these over before they are actually to be used would mean a serious curtailment of the carrying capacity of our merchant marine. The proposal of the Shipping Board to construct as quickly as possible a large fleet of moderate sized, two decked wooden freighters, dividing the work up among the wooden shipbuilders of the country in such a way as to secure the shortest deliveries, is an excellent one. The chief difficulty in the fulfillment of this plan would be with the production of sufficient engines and boilers rather than with the hulls.

But whatever our Government proposes to do, it is the duty of each and every one of us to see that it is done well, so that the enemy shall encounter an unbroken front and realize that once we have taken up the sword we will never turn back until a just and permanent peace has been established throughout the civilized world.

NEW RULES NECESSARY

The tremendous impetus in the industry of building wooden ships on the Pacific Coast brings the necessity of formulating new rules and tables forcibly before the great classification societies of the world. The materials out of which wooden vessels are constructed have changed as has also the type of craft, the rules of the classification societies covering their construction have remained practically unaltered to meet the new conditions.

The reason for this state of affairs lies, of course, in the long period of stagnation in the industry. Ships are very seldom constructed of oak in these days, to hear of one that is copper fastened is a rarity and copper sheathing has become a dream of opulence. Keel and keelson timbers of great girth and over one hundred feet long had never even been contemplated. On the Pacific Coast a special wooden vessel has been developed, a single decker with an extremely high ratio of length to depth. Spacing, depth and thickness of floors, ceiling timbers, the extent of edge bolting and the size and spacing of the same all vary widely as between ships of similar depth, beam and length. An unfortunate result of this condition is that when a designer makes an error in his strength calculations and the ship develops a tendency early in her career to hog or sag, to strain or open her seams, discredit is at once thrown upon the wooden ship no matter what her type or who designed and built her. The steel shipbuilder, through the more or less rigid rules set down by various classification societies, is more or less safeguarded against serious errors of judgment.

In Lloyd's rules we find that the shrouds are specified according to tonnage. It would be just as sensible to base all rules and regulations pertaining to the engine and boiler room of a steamer upon her tonnage rather than upon the horse power of her steam plant. The height of masts, area of canvas and the beam of the ship are the three factors which should govern the weight of the shrouds, but the variation of these three factors in different vessels have absolutely nothing in common with variation in tonnage.

Numerous instances could be cited such as the above where classification rules and tables for the construction of wooden ships have lagged far behind the present requirements of the industry and the situation presents a splendid opportunity for the American Bureau of Shipping, for it is in America that the wooden ship must be built if the production of such vessels is to be large, to formulate new rules that will adequately meet the requirements of the great industry that has awakened from a long period of lethargy and entered upon an unprecedented era of activity and achievement.

TWO WEEKS ON THE FARM—WHY NOT?

The most universal question in the United States to-day is, "What can I do to serve my country?" Hundreds of thousands of men who are beyond the age that will probably be set on volunteers for active military duty are asking themselves this question. Service to one's country means sacrifice, at least this must be conceded to be so in ninety-nine cases out of a hundred. And the hundredth case? Why, here it is—an opportunity to serve your country in a valuable manner and at the same time serve your own best interests.

A certain Scotch worthy had visited some friends who were noted for their tendency towards meanness. On his return he was asked by one of his cronies if he had a good time. He replied in the negative.

"And were they no good to you, Geordie?" persisted his questioner.

"Hoo could they be guid tae me when they werna' guid to theirsels," replied the long suffering one.

Now here is an opportunity for the city business man to be good to his country and good to himself at one and the same time.

California is a great fruit State and when the time comes around to pick the fruit the rancher may find that the recruiting Sergeant has got in ahead of him and he will be short of hands to get in the harvest. It is of vital importance to the American people and the American Government and doubly vital to our allies that we have some surplus food to give them next year as well as surplus money and surplus ammunition. The answer is plain. When that two weeks' vacation comes along get in touch with some farmer and go out and help him pick his fruit or harvest his grain. It will cost you less and do you more good both physically and mentally than any two weeks' vacation you ever had and at the same time you will be working for your country just as effectively as if you were a mechanic and took two weeks' vacation in a munitions factory turning out shells.

Now, all of this may sound rather out of place in a shipping magazine, but we assure you that such is not the case. Up in Seattle there is a large league that has been formed to carry out this very idea in the State of Washington and the chairman of that league is one of the Northwest's big shipping men, Mr. Frank Waterhouse.

PERSONALS

There were several promotions and alterations in the personnel of the Pacific Steamship Company on the first of April: C. E. Frye, general freight agent, became general passenger and freight agent with headquarters at Seattle; M. F. Cropley became assistant general passenger and freight agent with headquarters at Los Angeles; Harry Brandt, formerly assistant general passenger agent, was assigned to other duties, and George J. McCarthy, contracting freight agent at Seattle, became agent at Tacoma to succeed George M. Lee.

Mr. W. H. Todd, who heads the interests controlling the Seattle Construction and Dry Dock Company, a big new Tacoma plant, and the Robins dry dock and repair plant of New York, spent a few days in San Francisco in the early part of April.

Mr. A. O. Nelson has become general passenger agent of the Toyo Kisen Kaisha, succeeding Mr. C. Lacey Goodrich, who was transferred to the general managership of the company's affairs in Manila. Mr. Nelson's passenger service experience was started with the Pacific Mail Steamship Company.

Among those who came to San Francisco to attend the shipbuilders' conference held before Theodore Brent of the Federal Shipping Board was Mr. Charles Fulton, the San Pedro shipbuilder.

Mr. J. B. C. Lockwood has disposed of his interest in the shipbuilding firm of Supple, Ballin and Lockwood to Mr. Fred A. Ballin and the firm will now be known as Supple and Ballin. Mr. Lockwood will continue in the engineering business with Mr. Ballin, however. Work on the two large ships for Gaston, Williams and Wigmore of New York is proceeding rapidly.

Mr. J. E. Gilmore, formerly chief engineer of the steamer "Yale," has been appointed port engineer for the Pacific Steamship Company at Seattle.

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Salvage and Contributory Values

A SALVAGE case, of especial interest in these times of inflated values, was decided early in March last in the High Court of Justice, Admiralty Division, in England.

It appears that the S. S. "San Onofre," bound from Rosyth, in ballast for Tampico in February, 1916, had become disabled by reason of her fuel oil, "Mexican flux," becoming solidified through some derangement of the heating coils which were depended on to keep the fuel oil in a fluid state, and the steamer was at the mercy of the elements. By means of wireless communication the S. S. "Ashtabula," bound from Sabine, Tex., for London, went to her assistance. Owing to bad weather it was impossible to transfer fuel oil, of which a part of the cargo of the "Ashtabula" consisted, from her to the "San Onofre" and it was decided that the latter steamer should be taken in tow for Halifax, distant some 1300 miles. This service was successfully performed, although with great danger to the towing steamer and an actual loss to her of twenty-nine days' time.

The main controversy in the suit for salvage arose with respect to the value of the "San Onofre." The steamer was built in 1914 at a cost of £162,891, and on delivery her owners chartered her for a period expiring in 1930 on terms that would yield a fair return on her cost including the obligations imposed on the owners by the charter party. The owners admitted a value to them of £160,000. An appraisal on behalf of the marshall fixed her value at £369,841 18s 3d. (Why the shillings and pence?) On behalf of the owners it was contended that as the steamer was under a long time charter at a rate which would make only a fair return on the capital invested, £160,000, the value to them was that and no more, and if the steamer was put up for sale subject to that charter the price she would bring would be that amount. For the salvors it was contended that the ship should be valued as if she were a "free" ship at the abnormal prices then, and now, ruling for tonnage. In giving judgment on this point the Court held that if the "San Onofre" were disposed of at marshal's sale it would be without any obligations, the price realized would be that of a "free" ship and therefore that value should govern.

In the course of the testimony it developed that the "Ashtabula" was worth to her owners £1060 per day and that she actually lost twenty-nine days or a loss in time alone of over £30,700. It was also shown that she had lost in physical damages and extra expenses over £3.400, or an actual loss of over £34,000. In view of all the circumstances the Court awarded a total salvage of £36,550, of which the owners were to receive £32,000.

In reviewing this award several things are noteworthy. In the first place the amount, in money, seems large, and the Court in giving judgment said, "It is the largest I have had to award." But is the amount large in view of what was involved? The salving steamer was valued at, with her cargo and freight, about £370,000. She had admittedly suffered a loss in time, expenses and damages of over £34,000 and yet the award to the owners was only £32,000. Considering the time taken in which to render the services successful and the admitted danger to the salving vessel the amount does not seem excessive even for the salving of a steamer valued at £160,000. On this valuation the award would be something over 22 per cent, while on a valuation of £370,000 the award would be but 10 per cent.

It is not known here whether or not the "San Onofre" was insured but if she was it would probably be on a valuation of £160,000, and the question agitating the minds of the underwriters is, if she were insured here, or if a similar case arose here, and the policies contained the clause, which most of them now-a-days do, that the liability for and the settlement of any and all claims is to be governed by English law and practice, what would be the liability under the policies. The Marine Insurance Act, 1906, provides that where an assured is liable

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37-43 WALL STREET NEW YORK
AND BRITISH COLUMBIA, 264 COLMAN BUILDING, SEATTLE, WASHINGTON

for a general average contribution if the subject matter is not insured for its full contributory value the indemnity payable by the insurer must be reduced in proportion to the under insurance, and it also provides that the liability for salvage charges must be determined on the like principle. In other words if the contributory value in this case is to be taken at £370,000, then an insurer on a valuation of an amount less than this would be liable only for the proportion of the salvage based on the value on which the award was made. It is not the intent of this article to go into the question as to whether or not there is a "contributory value," the vessel being in ballast and there being no other interest to contribute, therefore making the claim a direct one against the underwriters irrespective of insured value or appraised value. Had there been any cargo on board, however inconsiderable in value, there would have been then a contributory value of the vessel and the principles laid down in the Marine Insurance Act would undoubtedly be applied.

But the main question is as to the value of the vessel for contribution in general average, for the purposes of making a salvage award, and for the purpose of ascertaining liabilities of underwriters.

The broad principle may be laid down that the value on which salved property is to contribute to general average or salvage is its actual value at the successful termination of the venture.

Lowndes, in his fifth edition on the Law of General Average, says:

"It must be determined how much better off in a pecuniary sense, each owner of property exposed to hazard on shipboard would be in event of safe arrival than in the event of total loss; and on this amount, which represents the benefits derived by each from the sacrifice which has saved the ship, each must contribute."

In writing particularly of the value of ships he says:

"One such test (of value) is the value in the market, which represents the current opinion of shipowners on the point, in the case of ships of a peculiar build, or having qualities which specially adapt them to some limited trade, the value in the market may not come near to the real value."

McArthur says:

"The value of the ship for contribution is her worth to the owner at the time and place of adjustment."

Similarly Gow, on marine insurance:

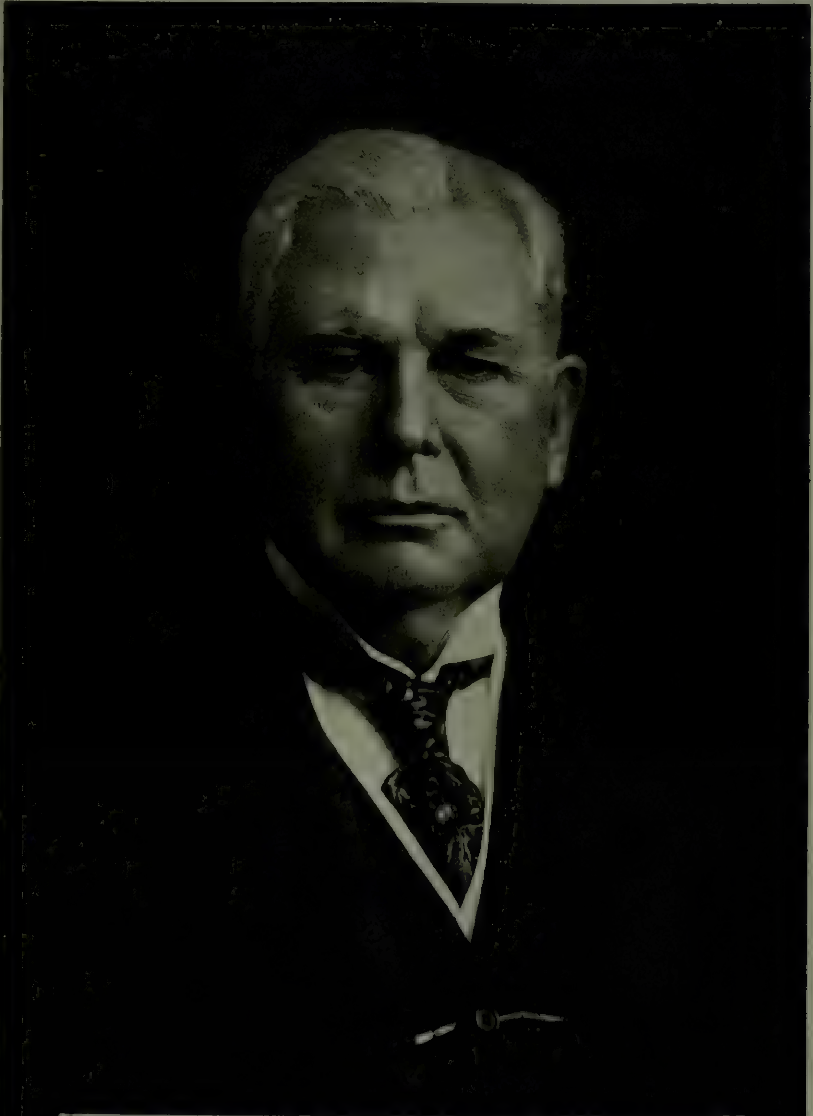
"The value for contributing purposes of a ship is her worth to her owner on her arrival at her destination, or if the venture does not reach its destination, then the ship's worth at the place where the interests part company."

And in Arnould on Marine Insurance we find:

"The ship is to be estimated for the purposes of contribution solely with reference to her value as finally saved by the sacrifice; that is, her worth to her owner at the time and place of adjustment."

Many references are cited by these authorities and the opinion is general that the vessel must contribute on her value **to her owner** at the termination of the venture or the time and place of adjustment.

Applying these principles to the case under discussion, what was the value of the "San Onofre" at the termination of the salvage services? She certainly was of great value to someone in the present unprecedented profits for shipping but can an outside someone be brought in as a contributing factor to general average or to a salvage award. Certainly not the purchaser for he buys the steamer free of all incumbrances. She is of great value to the charterer, for he has obtained her services for a long period at a very low rate of charter, but his profits may be terminated at any time by the loss of the steamer and their durability is too uncertain to bring him in as a contributor. The shipowner is the only one to look to and the value of the steamer to him is that of an earning mchine and her earnings are limited to the terms of the charter party, which, being for a very long time must limit her earning capacity for purposes of sale to the earnings under that charter, and a selling value accordingly. May not this steamer be considered in the



STEVENSON TAYLOR, HEAD OF THE AMERICAN BUREAU OF SHIPPING, A RECENT VISITOR TO THE PACIFIC COAST.

category of those "having qualities which adapt them to some particular trade," in this case the "qualities" being the existing charter party, which would make her value in the market considerably less than her real value? It is true that the Court said that if sold by the marshal she would be sold as a free ship and would therefore bring her full market value, but in that case the charterer would have a valid claim against the owners for a very material sum for damages, which must be taken into consideration in determining her value to her owners.

There is, however, another phase of this question, and that is the amount the underwriters should pay. Grant for the moment that the liability of underwriters would be governed by the appraised value of and not by the value agreed upon in the policies. In making the award for salvage the Court took into consideration the appraised value of the vessel of £368,000 and awarded £36,550. Had the appraisers seen fit to take into consideration the existing charter party and valued the steamer at £160,000, would the Court have awarded a sum less than one-half of the amount it did award on the higher value? It is true that values involved have more or less effect on awards for salvage services and that the greater the values the greater the award, but the award does not increase in direct ratio with the value saved. It is safe to assume that had the "San Onofre" been valued at £160,000 the Court would have awarded not less than £30,000 and for that amount the underwriters, assuming that the steamer was insured in full for that amount, would have been liable, but if their contention be correct that they are liable only for their proportion based on the appraised value then they would pay but about £16,000, a condition contrary to the equities which govern in marine insurance contracts.

Stevenson Taylor

STEVENSON TAYLOR, President of the American Bureau of Shipping, Past President of the American Society of Naval Architects and Marine Engineers, Past President of the Engineers' Club in New York and a man who has been honored by many other high positions and who has always done these positions honor, was a recent visitor to this coast and his presence here naturally created new interest in the work which he has now undertaken,—a work which means much to the future of the American Merchant Marine.

In the early part of 1916 Mr. Taylor severed his connections with the Quintard Iron Works Company to assume the Prsidency of the American Bureau of Shipping and the reorganization of the same.

On the journey home from his recent visit to the Pacific Coast Mr. Taylor received a telegram on the train at Chicago from Acting Secretary of Navy F. D. Roosevelt, saying the Government desired to secure his services on a Board of Appraisal of Merchant and Pleasure Vessels, which may be used in the Government service. Immediately on his arrival in New York he telephoned Mr. Roosevelt accepting the appointment without recompense for services, also tendering the services of the American Bureau of Shipping surveyors without charge.

The Board of Appraisal is composed of three naval officers: Captain A. F. Halstead, Lieutenant Commander E. C. Kahlbfus and Naval Constructor Horatio G. Gillmor. The civilians on the board in addition to Mr. Taylor are Mr. A. Loring Swasey and Mr. Daniel Bacon. The civilians have each received the commission as Lieutenant Commander United States Naval Reserve Force.

Following this appointment the U. S. Shipping Board has appointed Mr. Taylor as one of a board of four to take charge of the German vessels recently seized in New York harbor. The duties of this board, composed of Messrs. Frank Martin, George Robinson, Robert McGregor and Mr. Taylor, President of the American Bureau of Shipping, are to inspect the vessels mentioned above and to supervise the repairs made necessary by the destruction of parts of the machinery made by the engineering crews in response to an order from the German Government.

Recently, while in Los Angeles, Mr. Taylor noticed in the papers that he had been selected by General George Goethals as one of ten distinguished engineers of the U. S. to form the nucleus of an American Academy of Engineers. He has also been made one of the trustees of the American Institute of Weights and Measures.

Balfour, Guthrie and Company have contracted with the St. Helens Shipbuilding Company of St. Helens, Oregon, for a five-stick topmast schooner, a duplicate of the "Columbia River," built for Balfour, Guthrie and Company last year at Grays Harbor. The new craft will be 225 feet long, 42 feet 6 inches beam and 21 feet depth of hold.

According to reports, the Western Shipbuilding Company of Tacoma, Washington, the concern which recently took over the affairs of the People's Shipbuilding Company, is contemplating the construction of a very large wooden vessel to have a capacity of between 1,800,000 and 2,000,000 feet of lumber. Captain W. H. Varney is the Superintendent of this concern.

Motive Power of the M. S. "Santino"

THE completion and delivery of the motorship "Santino" has been watched with a great deal of interest by all people interested in marine power. The "Santino" is a wooden vessel, built to contract by the Grays Harbor Shipbuilding Co., of Aberdeen, Wash., and it is of exceptionally heavy design and construction. She is 296 feet long over all, forty-eight feet beam, twenty-four feet moulded depth, 2400 gross tons, and has a carrying capacity of 2,250,000 feet of Washington fir.

She is what is called a five-masted top-mast auxiliary schooner, her main power plant consisting of twin screw Sumner heavy oil engines.

In line with the policy of the Pacific Marine Review to furnish its readers with all things that are new and of interest in the marine world, we are now able to give them a complete description of these engines as installed.

The designer of the Sumner heavy-oil engine, Mr. H. W. Sumner, is well known among the engineering people of the Northwest and San Francisco, having been a resident of the Pacific Coast for several years and having been associated with mechanical work in various branches, both as designer and consulting engineer. Mr. Sumner also possesses a technical education. For a period of three years he was connected with the Lunkenheimer Company of Cincinnati, Ohio, as mechanical expert, and afterwards entered the manufacturing business and built stationary gas-engines. In his time he built the largest cylinder sizes of horizontal stationary gas engines then built and some of these engines have been in continuous operation ever since the date they were installed.

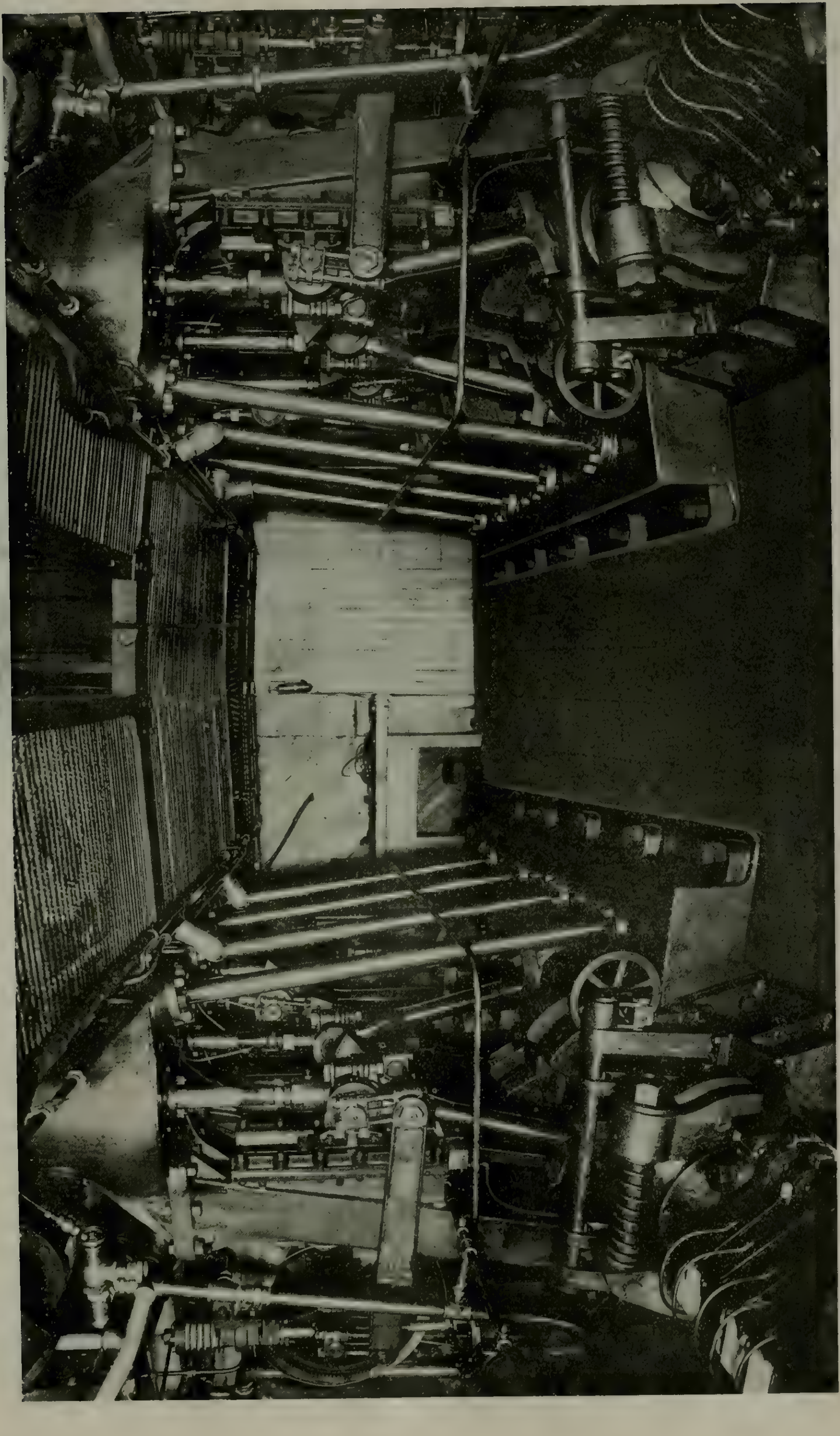
The design and construction of the engines in the "Santino" were not the undertaking of a moment, nor the acceptance of an offered contract. For some time previous Mr. Sumner had been working on the design of a heavy oil engine that would be adaptable to marine service. After a vast amount of study and preliminary designing, he outlined an engine which he thought would be successful and a proposition was made to the contractors for the "Santino" in competition with all other engines in the market. The specifications for these engines and preliminary drawings were submitted to the contractors, who were very much interested, and upon submitting it to their chief mechanical expert, they were informed that if that engine were obtainable, even though it had not been constructed, that it was an engine, from all appearances, superior to any other. The contractors sent their expert to Seattle to interview Mr. Sumner and see the working drawings of his engines and to receive full information regarding the parts which did not show in the original drawing. Their expert was fully convinced as to the practicability of the engine and contracts were closed for the construction of them.

The five-masted motorship "Santino," powered with Sumner engines.

A firm was then formed, known as the H. W. Sumner Company, of which Mr. A. E. Parker became a member. Mr. Parker is known in the Northwest in connection with undertakings of large character and occupies an active business position with the company. Offices were established in the L. C. Smith building, where they maintain their engineering department.

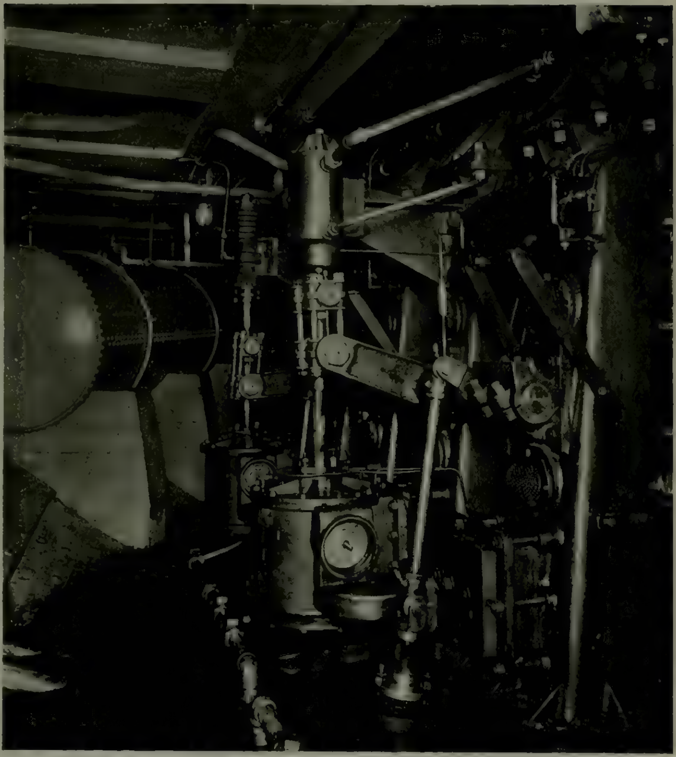
A detailed description of these engines should be interesting to the readers of this magazine, and we trust that it will prove so.

The engines are four-cylinder, single acting, two-cycle and known as "surface ignition." They are of the low compression type, the maximum compres-



The engine-room of the M.S. "Santino," shown with engine-room ladders removed. This vessel's performances are being watched with great interest, as she is the first vessel equipped with Sumner heavy-oil engines.

sion being approximately 140 lbs. absolute. Fuel oils of 23 to 28 gravity Beaume are burned in them, and with the exception of structural detail and design they differ very little from the already known two-cycle engines on the market. The design and construction of the engines for sea-going service are the most interesting. All other engines were taken into consideration in designing them, and all good and valuable features which were permissible were adopted and used. Below the cylinders they are practically identical in design and construction with all present up-to-date marine steam engines. In other words, the engines have round turned steel columns in front, cast iron back columns with solid guide surface, and open crank pits. The crankshaft is in one piece from a solid steel forging, lying in brass roll-out bearings, having babbitted bearing surfaces. To remove the crankshaft lower bearing, it is not necessary to disconnect any connecting rods or to lift your shaft clear of the bed plate; all that is necessary is to remove the bearing cap, lift the top brass, shims, and shim holders off, place a jacket under the shaft and merely tighten it up sufficiently to take the weight off the bearing and the brass can be rolled out. All main bearing brasses, top and bottom halves, are interchangeable. This also applies to the crosshead pin brasses, and it will be seen that it is a very valuable feature when a person stops to think that all the wear is only in half of the bearing on a single acting engine and that all the other half bearings are in realty spare ones.


View of the back of one of the "Santino's" engines showing rocker arms for pump drives.

The connecting rods are steel forgings finished all over, having a tee shaped bottom end machined to receive the crank pin brasses, which are of cast steel and babbit lined, and maintain them in alignment. The top end of the connecting rods carry the cross head pins. They are solid steel forgings turned, hardened, ground and shrunk into the yoke, thereby leaving only one cross head bearing for adjustment. Two of the cross head pins have extensions on each end for links which drive the beams for operating the accessories.

The cross heads are steel castings with roll out brasses, steel caps and a detachable guide slipper. The cross head pin bearing surfaces are bronze and the guide slipper is babbitted on both astern and ahead faces and runs on cast iron.

The thrust shaft has a somewhat unique feature, inasmuch as it can be entirely disconnected from the crank shaft in about two minutes' time without the removal of any bolts or the use of any wrenches. The after end of the crank shaft and the forward end of the thrust shaft are splined to receive a slip coupling collar, machined to suit, and which makes a positive drive when slipped into place over the thrust shaft. Moving the slip coupling collar is accomplished by the turning of a hand wheel designed for that purpose. The thrust shaft is carried in an independent thrust block which is bolted to the after end of the engine bed and has the well known horse-shoe type of thrust with the collars running in an oil bath. Immediately aft of the slip coupling is a large V-shaped friction clamp. The slip coupling and clamp were particularly designed with a view of using these engines as auxiliary power in sailing vessels, because it permits a rapid and easy disconnection of the engines and allows the propeller to spin idly when sailing.

All accessories on the engine, which consist of cooling water pump, bilge pump, two double acting scavenging pumps and a compressor capable of delivering air at 200 pounds pressure are beam driven. The force feed lubricators are also beam driven, no eccentrics, silent chains or belts being used.

The 200-pound air compressor is used to charge and maintain the air pressure in the air tanks which are used for starting purposes, oil service pumps, burner tanks, whistle and air for the burners. All bearings in the engines are exposed and accessible and may be felt and oiled while under way. Experience has shown that this is a necessity in marine engines. Furthermore, it permits the engineer who has a steamer license to know the type of engine he is handling, because he has something with which he is familiar.

The bed plate of the engine is cast iron of very rigid construction, and has a solid cast bottom in the crank pits with a drain at the after end for taking care of the used lubricating oil which can be collected in a sump, cooled, strained, filtered and reused. To the front end of the bed plate is secured a jacking gear, which when in mesh engages a worm wheel on the crank shaft so that the engine may be easily jacked into any position to facilitate adjustment, alignment, overhauling or repairing.

Next to this worm wheel is a spiral gear on the crank shaft driving a spiral gear on a vertical shaft by which the governor and fuel injection pumps are operated. All the gears used are steel, heat treated, spiral cut and run in cases filled with grease so that they are noiseless.

The cylinders are close grained cast iron, water jacketed over all surfaces excepting the intake port for the scavenging air. The water jackets are provided with large sized hand holes at the top and bottom ends so that examination and cleaning of the water jackets may be easily accomplished. The pistons are of the trunk type carrying four rings at the top ends and provided for eye bolt holes on top for withdrawing them from the cylinders. The top end connection of the piston rod, which runs through a stuffing box at the bottom end of the cylinders is made in such a way as to keep the connection out of the heat and still make a positive fastening. The piston is particularly designed with a view to avoid all distortion due to the heat of compression or explosion. On the back of the cylinders is a water cooled air valve and relief valve body, the relief valve being similar to the snifter valves used on marine steam engine cylinders and safe guards the possibility of accumulating excessive cylinder pressures. The cylinder heads are very substantially secured to the cylinders and have counter-sunk gasket surfaces. On top of the cylinder heads are the combustion chambers, torches for starting, and the fuel injection nozzles. The combustion chambers are of heavy steel castings and the design and construction of the same are of such a nature that the engines may be entirely stopped for a half hour and immediately started without the necessity of lighting the torches.

It is a well known fact that the biggest and most intangible problem in heavy oil engines is the combustion of the fuel. The fuel must be burnt completely. There must be no carbon deposits, as carbon will give trouble. To obtain complete combustion in the cylinders, it is a necessity to have an abundance of scavenging air and that is the reason that Sumner engines are provided with scavenging pumps and is also the reason why Sumner engines burn the fuel clean.

The scavenging pumps, which are beam driven on the back of the engine, furnish air at about six pounds pressure to the main cylinder (this is in addition to the air delivered by the under side of the main pistons which act as scavenging air pumps as they do in the ordinary two-cycle engine), so that the engines receive about twice the volume of air per stroke for scavenging and combustion purposes that the ordinary two-cycle engine does.

All cylinders are lubricated on the force feed system, each main cylinder taking oil at four points in its circumference, the scavenging pumps having two force feed leads, the air compressor and air distributor valve on one head each.

The exhaust of each cylinder is into a cast steel chamber. These are fastened together end wise by through bolts. Between each exhaust chamber is a copper expansion ring similar in design to the furnace of a Scotch boiler. This permits expansion of the exhaust manifold and still prevents any stress being placed upon the cylinder alignment. Contrary to a much accepted and developed idea that it is necessary to have a water cooled exhaust, these engines are operated without it, it being claimed that immediately condensing the exhaust gases produces tar and other asphaltic deposits to take place. By leaving the exhaust gases go out warm, not hot, all of this is carried away.

There is a small water spray installed in the end of the exhaust manifold, but is merely used to keep the temperature from becoming excessive. Large accessible hand hole coverings in each exhaust chamber are readily removable and permit the inspection of the exhaust ports in the cylinder.

On the vertical gear shaft at the forward end of the engine is keyed a rotating floating air distributor valve having a stationary housing. Into this housing are lead two intake pipes for air, and delivering from it are four pipes—one to each cylinder—which feed the air for starting purposes. The design is such that there can never be any dead center and practically a uniform turning moment on the crank shaft. In the before mentioned air valve body is placed a check valve so that when the engine is started, the explosions will automatically cut off the air intake and none will enter the cylinder. The air to the distributor valve is controlled by a three-way valve, one lead being for the live air, one for discharge to the air distributor in the go ahead direction and one for the go astern direction. The handling of it is so easily accomplished that the strength of an average man's finger is all that is required to start these engines.

Air pressure of sixty pounds is found sufficient to start without any release of compression, so that it can readily be seen that the bugaboo of storing and handling high pressure air is eliminated. All that is necessary to start the engines is to throw the three-way valve lever in the go ahead direction, pulling it back to mid-position it becomes neutral and admits no air. Pulling it in the astern direction feeds air into the main cylinders for operating the engines astern. All the air handling apparatus is designed and tested to safely carry 200 pounds pressure, as it will be easily understood that a high pressure will put more life into the engine for handling purposes. No air is used for fuel injection purposes, although it was carefully tried out in order to determine if there was any value in it. The elimination of high pressure injection air helps to simplify the construction and the upkeep connected therewith.

Along the front of the engine cylinders is a heavy steel beam to which the fuel injection pumps, drip feed oilers, throttle valve, fuel injection timing device, and all other small accessories pertaining to the fuel or control of the engines are secured. This beam also serves to tie the cylinders together, although the design is such that each cylinder in itself and its own fastenings are ample to take care of the powers generated therein.

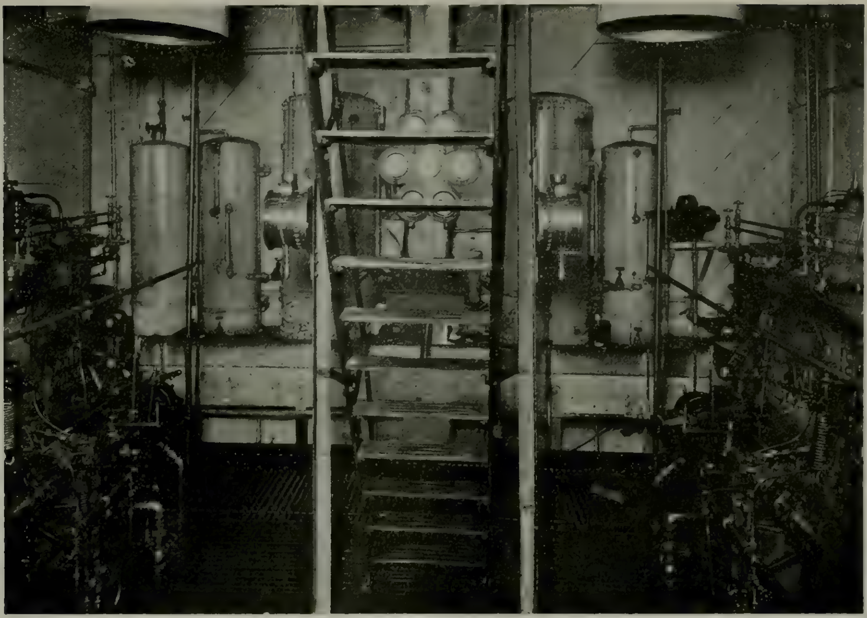
The fuel injection pumps, one for each cylinder, are cam actuated. The pumps are secured to steel brackets fastened to the tie beam and these same brackets carry guides for a sliding cross head, to which is pivoted a lever on which the cam roller acts. Moving this cross head into a position where the fulcrum of the lever is directly over the fuel pump plungers puts the pumps into a no-stroke position, even though the cam might be rotating and stops any fuel from going into the nozzles. Sliding the cross heads away continuously increases the stroke of the pumps until the maximum is reached. These cross heads are handled by the governor shaft when the throttle valve is locked in any position excepting closed, handling the throttle valve takes the control away from the governor automatically until locked into position and then the governor takes charge again. The cam shaft runs at the same speed that the engine does and at the same time permits the injection of the fuel in a very short space of time, far less than an eccentric operated fuel pump could do it in. The timing sleeve is a very clever little device, very simple, which makes it possible to control the injection of fuel over a 30 degree arc of crank travel. It can be set with the engine in motion and without any effort so that the injection may start to take place at a predetermined point before the crank arrives at the top center or just as it arrives at the top center. By this means the injection of the fuel is always under the control of the engineer and also prevents the possibility of any premature explosion taking place, such as a change in the gravity of the fuel oil would cause.

Substantial hand rails and splash plates are provided at the bottom of the engines.

The engines are of rigid and heavy design, particularly adapted to commercial work, but even at that the design is such that the weight is only about 114 pounds per horsepower. The economy of space will be known when it is seen that 800-hp. twin screws are placed in a vessel with a hatch of only eighteen feet fore and aft length and still plenty of room is available for getting around them and leaving all parts accessible. The length of the engine on the bed plate, including jacking gear and thrust shaft, is less than seventeen feet. The length over the cylinders above the grating is approximately eight feet. The height from the top of the engine bed timber over all is approximately thirteen and one-half feet.

The construction of these engines was made under contract by the Puget Sound Iron and Steel Works of Tacoma, Wash., who possibly have the best equipped shop for construction of this size work. All parts of the engines with the exception of the heavy forgings were made at their plant.

On the completion of the first engine, it was erected on a test stand, foundation timber 24"x30" being used. A small piece of shafting was secured to the thrust shaft flange with its outer end carried by a spring bearing. On it a large pulley was keyed. From this was belt driven a 250 K. W. alternating current generator at 600 revolutions per minute. A water rheostat, switch board and electrical instruments were provided for measuring the capacity of the engine. This engine, the first one constructed, according to theoretical calculations was expected to develop 392 shaft horsepower. The maximum loads obtained were 460 horsepower on the switch board and 550 indicated horsepower. Fuel tanks and air tanks similar to those on board the ship were used. Various kinds of fuel were burned, ranging from 23 degrees to 27 degrees plus Beaume. Tests showed a clean



The forward engine-room bulkhead on the "Santino," showing the roominess of the engine-room and the centralizing of the engine control.

consumption of the fuel and the combustion was complete. Consumption per horsepower hour averaged .58 to .60 pounds. The maximum explosion pressure recorded was 243 pounds per square inch, compression 140 pounds absolute per square inch.

Assisting on these tests was Mr. H. R. Gelhaus, who represented the purchasers of the engines. Tests were conducted lasting from one-half hour to twelve hours continuously, covering a period of more than two months. The main object of these tests was to prove the theoretical calculations used in designing the engine in addition to the horsepower and fuel consumption, also to bring out any defects in workmanship which might arise. It can be said without hesitation that the engine was subjected to far more severe conditions than it would ever receive when installed on board the vessel.

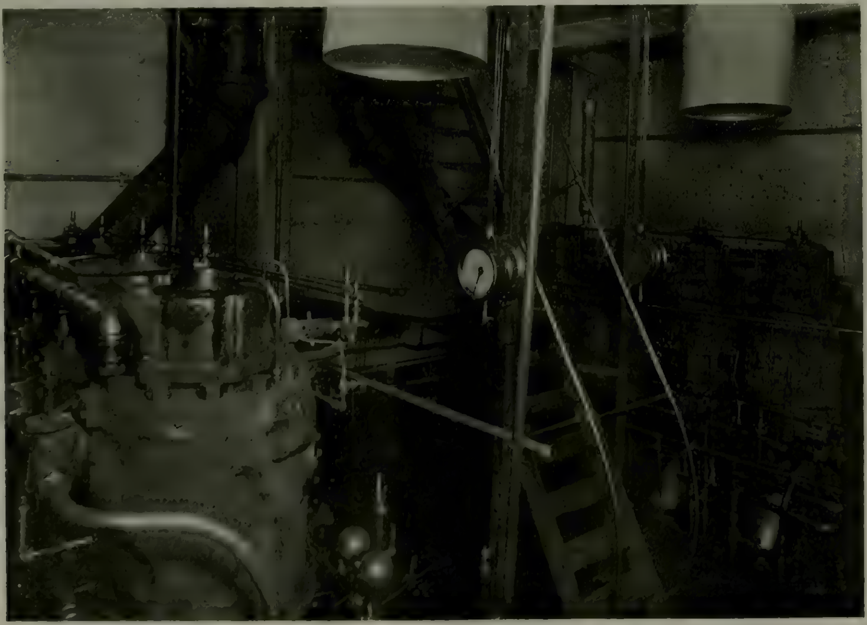
The engines were shipped to Aberdeen and installed in the "Santino" at the plant of the Grays Harbor Shipbuilding Co. Inspection of the photographs with this article will show how the engine room was arranged and the general class of work and construction prevailing. The engine room is located in the after end of the ship directly under the break of the poop deck. Entrance is from the break of the poop deck into a companion way in the main quarters and through the muffler room. A safety exit is located at the after end of the ship opening up into a store room, which leads into the main companion way. At the forward end of the engine room is a solid cross planked bulkhead extending from the ship's inner planking to the main deck. The engines are installed so that the controls are inboard with the telegraphs, one for each engine close by. On a four-foot shelf, made by the between deck beams, are installed the day tanks, burner tanks, filters, strainers, fuel service pumps, meter and a kerosene storage tank for the auxiliary engine burners. All the space on the between decks aft of the forward engine room bulkhead with the exception of the extreme after end is occupied by fuel tanks having a total capacity of 1620 barrels.

The suction lines from the fuel tanks are carried to the after end of the engine room and manifolded so that suction from any tank (there being six of them) can be controlled from the grating. Arrangements are also made for trimming ship by transferring the fuel from one tank into another. In the center of the ship on a between deck stanchion and over the engineer's log desk, is mounted the gauge board, having the necessary gauges for operation. At the after end of the grating is a companion way leading to the engine room floor. On the port side at the forward end of the engine room is a substantial work bench equipped with drawers, vise and tools. Outboard of the main engine and the end of the bench is installed a two-cylinder Remington oil engine which operates through a clutch, a Goulds triplex plunger pump which is used for fire and bilge purposes. On the shaft of this auxiliary engine is a pulley which drives a belt-driven Ingersoll-Rand air compressor for auxiliary purposes. On the starboard side at the forward end of the engine room is installed a single cylinder Remington heavy oil engine, direct connected to an electrical generator. The switch board is mounted on the forward bulkhead. Aft of the main engines and outboard of the tail shafts are installed two air tanks. In the extreme after end are located two lubricating tanks, one being used for cylinder lubrication oil. The propellers are inboard turning, cast iron, three-bladed, 6′ 6″ in diameter, having a five-foot true pitch.

Tests of the engines prove them to be very rapid in handling, faster than steam and just as positive, and also that it was possible to handle them at slow speed. The engines can be run at fifty revolutions per minute and gradually built up to over their rated speed, which is 210 revolutions per minute. It is not necessary to start them at the maximum power. There was no vibration noticeable.

The trial trip was held on March 25, 1917, and was run in Grays' Harbor, the insurance on the vessel not permitting it to be taken outside the bar. Due to the engines being new and untried and very narrow winding channels to navigate, it was considered advisable to have a tug in attendance, but after getting away from the dock and receiving full speed signals, the tug did no further work. The engines were operated at a speed of about 170 revolutions per minute and worked in a manner that received approval from all on board who witnessed them. During the trial trip the vessel was in charge of Captain George Sanborn of Hoquiam. Amongst those on board were Mr. M. R. Ward, Mr. Schubach, Captain Fowler, Lloyds' surveyor; Captain Frank Walker, Bureau Veritas representative; Captain M. Howard, representing the owners of the vessel; Mr. Hynd of New York city and Mr. H. W. Sumner. The trip lasted approximately seven hours and the operation was satisfactory with the exception of such small minor details as develop on trial trips.

The "Santino" was to leave for Portland to go on dry dock and have the bottom copper painted, then load at Westport on the Columbia river and proceed to the East Coast with her cargo. On attempting to leave Grays' Harbor the weather was very rough and she was bar bound for over twenty-four hours. As soon as it was possible for the tug to take her over the bar they started. Once over the bar the tug cast loose and left the "Santino" to her own resources. The seas were mountain high, as there was a gale blowing, but in spite of this they maneuvered the ship, adjusted the compasses and set sail to steady her. They headed directly off shore to have ample sea room, as the ship was unloaded and without ballast. This same storm dismasted the three-masted brigantine "Harriet G." a few miles north of Grays' Harbor. The owners of the vessel felt doubtful about her making the trip to Portland with the weather in such condition, and sent a tug out from Astoria to look her up. Casting the tug off at Astoria, the "Santino" proceeded up the Columbia river to Portland at a speed of seven miles per hour under its own power.



View taken on a level with the cylinder heads, showing fuel feed, snifter valves, etc.

Machine-shop at the Marine Pipe & Machine Works plant, where the Sumner engines are being built.

The Builders of Sumner Engines

It is always a matter of interest when an old-established firm in the engineering line takes up the manufacture of a new type of engine, and the announcement that the Marine Pipe and Machine Works of Seattle has taken up the construction of the H. W. Sumner semi-Diesel engine on a commercial scale will, of course, create special interest at a time when the internal combustion engine is demanding the attention of every shipowner on the Pacific Coast.

The Marine Pipe and Machine Works has long been recognized throughout the Northwest as a plant operated by capable people and the firm holds a record as marine engine and boiler builders, as well as for their pipe work.

The shop of this concern, pictures of which are shown herewith, is well equipped with modern tools and has always maintained an enviable reputation for workmanship. At the present time orders for six 350 horse power Sumner engines are on hand, and with the present demand for marine engines there is little doubt that expansion of the facilities of the Marine Pipe and Machine Works will soon be called for.

A corner in the Marine Pipe & Machine Works shop.

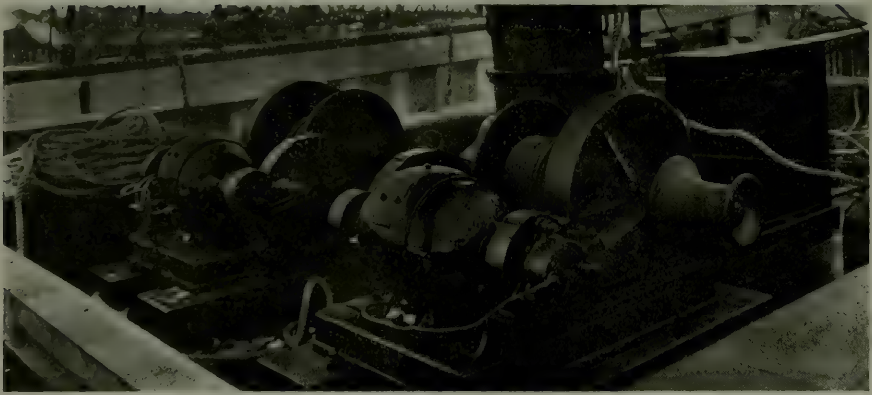
The general manager of the concern, Mr. J. F. Swanburg, is well known in Northwestern engineering circles. He came to his present position from the engineering department of the Pacific Coast Steamship Company, where he served under Mr. C. C. Lacey, at that time superintending engineer of the big coasting concern.

THE COLUMBIA ENGINEERING WORKS

Among the new wooden shipbuilding plants of the Northwest none has entered the field with more conservatism in the way of preparation, both of ship design and yard layout, than the Columbia Engineering Works of Portland, whose plant is located at Linnton, Oregon. At the time of writing, this yard had five contracts for wooden vessels on hand, the largest of which is a 2300 tonner. The plant is equipped with a double mill, air compressors, planers, circular saws, etc. The ground is graded for five building ways, three of which have been installed and have ships under way on them. The two smallest of the five contracts have not had their keels laid as yet, although considerable of their framework is sawed and once there is an opening for them on the ways work should proceed very rapidly. At the present time the Columbia Engineering Works employ about three hundred hands, but this number will shortly be materially increased, providing skilled labor is obtainable.

Captain O. D. Treiber, President of the National Shipbuilding Company of Seattle, has offered the service of his plant to the Government for the construction of 100 wooden hulled submarine chasers.

O. M. Williams, who has been representing the Washington State Manufacturers' Association in the Orient, delivered an interesting report on Far Eastern trade conditions at a great banquet held in Seattle on April 21.



The electric winches on the Motorship "City of Astoria."

Electric Winches Create Great Interest

THE most satisfactory type of auxiliary machinery to use on oil engined vessels has for some time been an undecided question. There are practically only two types worth considering. These are steam and electric.

Steam auxiliaries still have many advocates among shipbuilders, masters and owners. Some have for their reason that steam equipment is cheaper in first cost than the electric; others have had some unfortunate experience with electric equipment unsuitable for the purpose for which it was used, and still others have no time for what they call "experiments," forgetting, or not realizing, that the motor-ships which they are building are much more of an experiment than the electric winch or windlass, or the electric pump, for instance.

Consequently steam auxiliaries are still being used on a great many otherwise modern motorships in spite of their inconvenience and inefficiency, and the many serious disadvantages incurred by their use. From the standpoint of convenience, there is no comparison between getting up steam in a cold donkey boiler and starting a Diesel engine generator set, which can be brought from stone cold to full power in a matter of thirty seconds, or even a surface-ignition engine generator set, which can be started in from three to five minutes. This alone is a strong factor in favor of the electric equipment, especially on auxiliary powered sailing vessels where the winches are used for handling the sails.

Again there is no comparison between a Diesel engine generating electric power on a fuel consumption of less than one--half pound of oil fuel per brake-horsepower hour and a donkey boiler burning five pounds or more of coal per horsepower hour. Even when the donkey boiler is fired with oil fuel, the fuel consumption will be anywhere from ten to thirty times as much as a Diesel engine would use to generate the necessary current to do the same work. The loss in transmitting electric current from the generator to the winch or windlass motor is practically negligible, whereas the loss in carrying steam from a donkey boiler to the winch and windlass due to condensation in steam-pipes and cylinders is enormous —to say nothing of the difference in the efficiency of an electric motor converting eighty-five to ninety per cent of the power delivered to it into useful work and a steam winch of the reversing-valve type, which wastes almost the same proportion of the steam which reaches it.

Where steam auxiliaries are used on motor-ships having Diesel propelling engines, it can easily be proved that the fuel consumption of the auxiliaries is excessive and out of all proportion to the fuel consumption of the propelling engines, thus materially detracting from the economy of the vessel as a whole.

Steam auxiliaries in motor-ships are fundamentally wrong, and there can be little doubt but that in the near future all motor-ships will depend upon electricity for operating their auxiliary machinery and probably also for heating the ship.

When Diesel propelling engines are being used, the cost of the electric auxiliary equipment should be little, if any, more than the cost of an equally complete steam installation. The Diesel engine generator set can be placed in the engine-room with the main propelling engines, occupying space there which otherwise would probably not be utilized and taking nothing from the cargo space of the vessel, besides being where the engineers on watch can handle it and consequently avoiding the necessity of having a donkey boiler fireman in addition to the regular complement of engineers and oilers. Moreover, the generating engine will take the same fuel as the main engines, exhaust into the same stack, and take its circulating water from the sea, thus dispensing with the separate fuel tanks or coal bunkers, fresh-water tanks, pumps, condenser and other annoyances inseparable from a steam installation, all of which will occupy space which would otherwise be available for cargo. The standby losses which are also inseparable from a steam plant are worth considering; for, as noted above, even a hot-bulb engine can be started in a very few minutes, so it is never necessary to waste fuel running idle for any length of time.

In connection with this, it would be as well to call attention to the tremendous advantage which would be gained by using electric cargo winches on steam-propelled vessels, especially those which are not equipped with a donkey boiler of sufficient capacity to handle the winches. A steam vessel with a Diesel engine generator set large enough to handle its cargo winches would be able to shut down its boilers completely when it came into port, and would save an enormous amount of fuel thereby, besides giving a much-needed opportunity to examine, clean and make necessary repairs to the steam boilers. The Diesel engine generator set would make an almost unbelievable saving in fuel consumption while the vessel was in port, while the electric winches would handle the cargo twice as fast as steam winches and would save the vessel a great deal of time in loading and unloading, which, of course, would increase the vessel's earning capacity. The constant annoyance due to leaky steam-pipes on deck and freezing steam-pipes and winch cylinders in cold weather would be entirely eliminated; instead of which the vessel would have a clean, smooth-running, compact winch, which would occupy less than one-half the deck space required for a steam winch of equal power. We believe the time is coming when ship-owners will realize that they can increase the earning capacity of their ships and add to the comfort of crew and passengers by using electric winches on steam vessels.

If the wiring, which takes the place of the steam-pipes, is properly installed, and if the proper type of motor and other electric equipment is used on the winches and other deck machinery, and all thoroughly protected from salt air and water as it should, and can, be, the cost of maintenance and repairs on the electric installation will be less than it would be on a good steam plant.

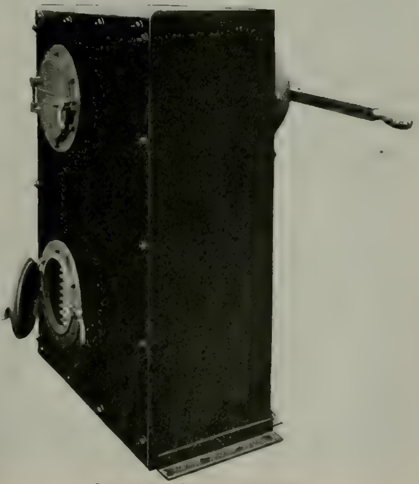
There is no question but that practically all the trouble which has been experienced heretofore with electric deck machinery has been due to inadequate protection of the electrical apparatus from the effects of salt air and water.

We believe our electric winches, as we are now building them, embody all the conditions necessary for successful operation on shipboard. The motors, which are General Electric, fully enclosed, crane type, are not merely weather-proof—they are made absolutely water-tight. The controlling apparatus is all enclosed in a water-eight steel control box. This box is provided with two water-tight doors which can be opened to furnish ventilation for the resistance when the winch is in operation. The lever shaft which operates the controller is carried through the side of the control box in a stuffing box and gland which is packed just like a piston rod. The wires are carried into and out of the box through pipes which make a waterproof connection.

The winches are simple direct-gear machines; they are not complicated with friction drums or band brakes of any description. The gearing is all cut, the pinions being forged steel, and all having a large factor of safety. The teeth make perfect rolling contact, so there is no back-lash on the gears and very little noise when the winch is running.

The control is entirely electric, a single lever on the control-box doing all the work. The load can be stopped and held at any point when hoisting or lowering. The stop is positive. The speed of both hoisting and lowering can be perfectly controlled. The controller provides for seven hoisting speeds and six lowering speeds. The motor is series wound, therefore will automatically speed up with a light load and slow down proportionally with a heavy load.

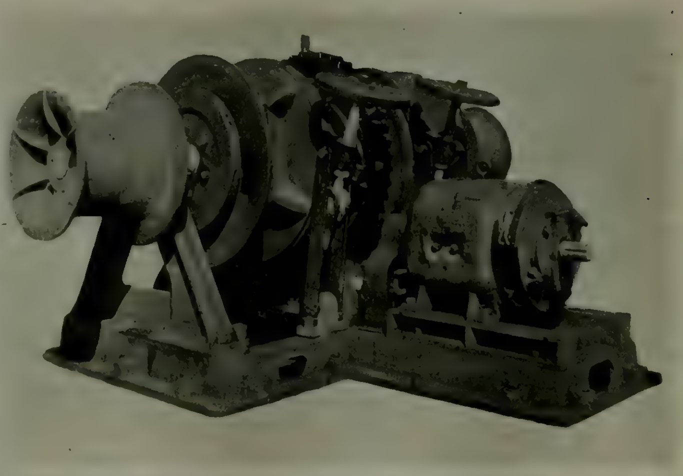
We build these winches in two sizes. The small size has a capacity of two tons on a single line, and the larger one a capacity of four tons on a single line. We can furnish them, if necessary,



Control box for an electric winch.

with a larger motor to give a capacity of five or six tons on a single line.

The four-ton winch will hoist 8000 lbs. at a speed of 100 feet per minute. The same winch, without any change in gearing, will hoist 2500 lbs. at about 300 feet per minute on a single line. This high speed can be cut down by the control lever if desired. The lowering is absolutely under control. The load can be dropped as fast as gravity will take it, or it can be slowed down to a lowering speed of twenty or thirty feet per minute. In addition, this control gives a positive unwinding drive which will bring down the empty hook or a light load as fast as desired. If the current should be cut off for any reason when the winch is working, the winch will automatically stop and hold the load suspended until the current comes on again; but the motor circuit cannot be closed until the control lever is placed in the neutral position, therefore should the current be cut off and the winch operator be careless enough to leave the control lever in one of the running positions, no harm would be done if the current was turned on again, because the motor circuit would not be closed until the control lever was returned to the neutral position. Each motor is protected against overloading or low voltage by a double-point circuit breaker and contactor panel; if the motor is overloaded or the current is cut off, the circuit breaker goes out. Returning the control lever to the neutral position automatically throws the circuit breaker in again. These being single-drum winches, two are required for each hatch, but as they are each controlled by a single lever, one man can operate both winches, he simply having one lever in each hand, and no foot brakes or throttles to bother him.



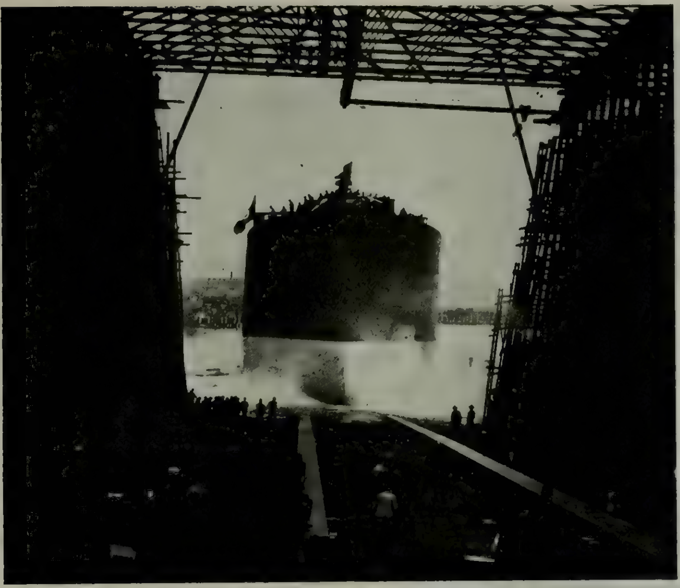
The electric windlass is a compact machine occupying but little deck space.

The winches operate in exactly the same way as a reversing-valve steam winch, the only difference being that the electric winches are always under perfect and positive control, while the reversing-valve steam winch is generally very far from being so.

The first vessel to go to sea equipped with our electric winches was the motor-ship "Astoria." This vessel loaded a cargo of lumber on the Columbia river immediately after leaving the builders' hands. The first day's loading, in a heavy snowstorm, with the lumber piles on the dock covered with five inches of snow and both stevedores and crew new to the winches, she put in 453,000 feet of lumber in eight hours. We believe this is undoubtedly the record for loading this type of ship anywhere. This record was made with our smallest winch, the two-ton size, and with the first set of this type which we had produced. We have since materially improved the winch and are now sure that the record could be greatly increased, provided the lumber could be stowed faster.

This fast handling was not due to excessive hoisting or lowering speeds; it was very largely due to the perfect control which the winch operators had over the load at all times. It was never necessary to drop the load to the bottom of the hold and pick it up again to enable stevedores below to swing it to where they wanted it landed. The load was dropped rapidly to within a few feet of the bottom and then slowed down to enable the stevedores to catch it as it came and swing it to place and land it just where they wanted it in one operation. It is true, however, that the winches returned the empty hook and picked up their load considerably faster than steam winches would have done.

We believe the smaller winch is large enough for this class of vessel, as it will undoubtedly put cargo in faster than it could be stowed. On the larger full-powered motor-ships, however, we would recommend the four-ton winch, as they probably will have larger hatches and facilities for stowing cargo more rapidly than was possible on the smaller single-deck vessel.



The "Tiger" taking the water at the Union Iron Works.

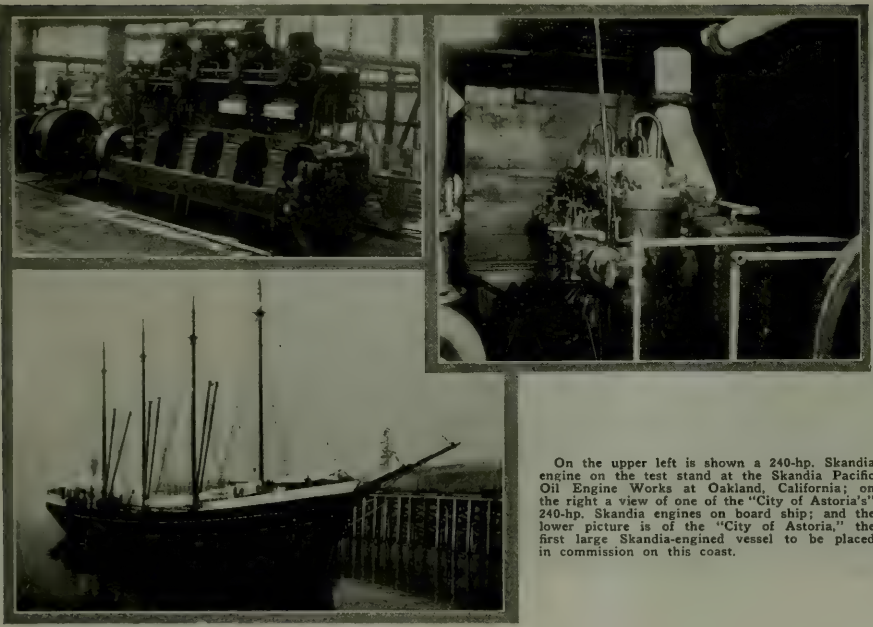
LAUNCH OF THE "TIGER"

The steamship "Tiger," built for the Standard Transportation Company of Delaware by the Union Iron Works Co., San Francisco, was successfully launched at noon Saturday, April 21, 1917. Mrs. Clarence O. Flint, wife of Mr. C. O. Flint, consructing manager of the sales department of the Standard Oil Company, and daughter of Mr. D. G. Schofield, chairman of the Board of Directors of the Standard Oil Company of California, christened the "Tiger."

The "Tiger" is 410 feet long by 56 feet beam by 33 feet 6 inches molded depth, and is driven by a triple-expansion engine with cylinders 27, 47 and 78 inches in diameter by 48-in. stroke. Steam is furnished by three Scotch boilers, with Howden's forced draft, fitted to burn either coal or fuel oil, and the indicated horsepower is 2600, which, on the trial trip of the sister ship "Eagle," launched by the Union Iron Works on February 3, 1917, developed 13.9 knots. The "Tiger" is to carry 10,000 tons of 2240 lbs., including cargo, fuel, water and stores, on a mean draft of 27 feet 6½ inches, and was built especially for the transportation of case oil. The estimated capacity of her cargo holds is 240,000 cases.

The vessel and fittings conform to all the requirements of the rules and regulations prescribed by the Board of Supervising Inspectors of steam vessels of the United States, and will be classed 100-A1 at Lloyds. The hull is built on the Isherwood system of longitudinal framing, and the loading facilities will be very rapid, the sister ship "Eagle" having demonstrated that loading can be carried on at the rate of 35,000 cases of oil per day, working through five over-all hatches. The arrangement of the accommodations for the captain, officers, engineers and crew are very exceptional.

Mrs. Clarence O. Flint, sponsor for the steamer "Tiger."



On the upper left is shown a 240-hp. Skandia engine on the test stand at the Skandia Pacific Oil Engine Works at Oakland, California; on the right a view of one of the "City of Astoria's" 240-hp. Skandia engines on board ship; and the lower picture is of the "City of Astoria," the first large Skandia-engined vessel to be placed in commission on this coast.

"Skandia" Making Great Strides

SKANDIA oil engines have been manufactured for the past eighteen years by the Lysekils Mek. Verkstads, Lysekil, Sweden, and have enjoyed wide and varied uses, being installed in nearly all parts of the world for both marine and stationary purposes.

About 5,000 of these engines have been installed in the fishing fleets of Norway and Sweden, but, until recently, few engines, either marine or stationary, were installed in the United States. In the latter part of 1915, Mr. J. H. Hansen and Mr. Jafet Lindeberg formed a partnership, known as J. H. Hansen and Company, which obtained the agency for the Skandia engines on the Pacific Coast.

This company was successful in obtaining many orders, both stationary and marine, for the factory in Sweden, but the business of the home concern increased to such an extent that it became practically impossible to obtain reasonable delivery and at the same time, owing to the rising labor and material markets in Sweden, prices were heavily increasing.

In the Fall of 1916, owing to the demand created on the Pacific Coast for Skandia engines, it was decided to form a corporation and secure a factory suitable for the manufacture of these engines. The Skandia Pacific Oil Engine Company was created and acquired the exclusive manufacturing and sales right for Skandia engines in America. Drawings, patterns and Swedish engineers were sent over to aid in the construction and superintend the installation of the engines built here.

This new concern took over the business of J. H. Hansen and Company and the plant of the Gorham Engineering Company, located on the Estuary in Oakland, California, was acquired and the manufacture of Skandias was started on an extensive scale. This factory was taken over on November 18, 1916, and on the same day raw material in the shape of connecting rods was delivered at the plant. On the following day more material was delivered and an actual start in building Skandia engines on the Pacific Coast was made. The Oakland factory was formerly used for the manufacture of marine gas engines and was well equipped with tools for building oil engines up to about 100 h.p. in size. It was therefore necessary that considerable of the machine work for the large engines be let to outside shops.

This plan has been found very successful owing to the close inspection on all work done outside and it will be necessary to continue work in this manner until the large machine tools now ordered have been delivered to the Skandia factory. The plant is situated at 2893 Glascock street, Oakland, and has a water frontage on the Tidal Canal, which connects with Oakland harbor. It has spur track facilities connecting to the Oakland Belt Railroad, giving access to the Southern Pacific, Western Pacific and Santa Fe railroad systems.

These facilities have been found of great value in receiving raw material and in the shipment of finished engines. An electric crane from the main floor of the factory runs over the spur track and a crane also handles material from and to the wharf.

Located in the main building of the factory is an office for the accountants and bookkeepers, purchasing agent, manager, etc., and just off this office is a large, well-lighted drafting room, which has been built since the Skandia people took charge.

The main part of this building consists of a machine shop well equipped with proper tools, and at the end of the machine shop a large testing room with concrete floor has been installed and equipped with all the necessary apparatus for thorough tests. A ten-ton electric crane travels the entire length of the shop and testing room and a second ten-ton crane, operating on the same tracks, is utilized for assembling engines. Air-operated jib cranes are fitted to individually serve the larger machine tools.

On the opposite side of the office is located a store room for raw materials and finished parts and this department is under the charge of a store keeper and his assistants.

A heat-treating plant is also located in this building, equipped with both electric and oil furnaces for the case-hardening of pine, etc. A brass foundry is set between the two main buildings and furnishes all the brass and bronze castings used in the construction of the engines. An extensive pattern shop is also provided, all pattern work being done on the premises.

A complete compressed air plant, including motor-driven air compressor and storage tank, furnishes compressed air to all parts of the factory.

At present writing about thirty 240 h.p. engines are under construction and the first six engines have been built and tested to the entire satisfaction of the builders and buyers, the engines having been found to be practical duplicates of the original engine as manufactured in Sweden. The first pair of 240 h.p. engines to be installed on this coast were built in Sweden, sold to A. O. Andersen and Company and installed in their motorship "Astoria," now on a voyage from Astoria to Port Pirie, Australia. This vessel called at Honolulu en route and reported the operation of the engines to be satisfactory. These engines are the only 240 h.p. units built in Sweden and sent to this coast. All other engines of this size and larger will be built in the plant at Oakland.

At this writing, April 20, two 240 h.p. engines have been built and delivered to A. O. Andersen and Co. for installation in their motorship "Margaret;" two more of the same size have been delivered to the same concern for the motorship "Mary." Two similar units have been delivered to Libby, McNeil and Libby for the "John F. Burroughs," recently launched from the yards of the Standifer Clarkson Company of North Portland, Oregon. The first engines for the Washington Shipping Corporation are practically completed and will be on the test stand in the near future.

About $50,000 has been spent in alterations, additions and new machinery for the Skandia plant and with the completion of the programme of enlargements and betterments, the factory will be well adapted to the manufacture of oil engines up to 500 h.p. units.

The Skandia is a two-cycle, hot-ball engine which runs on heavy crude residue fuel oil and is built in powers from 5 to 500 h.p. for both stationary and marine purposes. The marine engines, from 140 h.p. up, are direct reversible by admitting compressed air into the cylinders for starting in either direction and eliminate all reverse gears, clutches, etc., which are impractical except in low power units.

The engine is set on a one-piece bed plate, which holds all the main bearings for the crankshaft. holds all the main bearings for the crankshaft. The thrust bearing is also fastened to the bed plate. Bolted on this bed plate are the crank houses which support the cylinders. The cylinders, one of the most important and expensive parts of the machine, are made of special, close-grained iron and perfect machining is done on these by the most modern tools. The pistons, like the cylinders, are made with the greatest care and of the same special iron.

Owing to carefully calculated dimensions, special cooling by air and reinforcement arrangements, the heat and great pressure to which the pistons are submitted does not in any way affect their working nor do their become warped or distorted.

The piston pin is of steel and, after being turned, is case-hardened and ground true on a special grinding machine. The connecting rod is of steel and in its upper end holds the bronze piston pin shells, which are split in two halves. At the lower end is the crank pin bearing, which is also split in halves and is of bronze lined with white metal.

The cylinder cover contains the combustion chamber, where the necessary pressure for working the piston is produced. The principal feature of the Skandia engine is this water-cooled combustion chamber, which has added to it on the side a small hot ball which aids in the combustion of the fuel. The cooling in the combustion chamber is as effective as in the cylinder and this construction not only insures perfect working, but also increases the efficiency of the engine to a great extent. It has been found that the engine can retain the heat without load for longer periods than would otherwise be the case, an essential advantage in small engines for use in fishing boats, etc.

All engines are equipped with a governor, which works with remarkable precision. The speed regulation is effected by means of a lever. The governor is in direct connection with the fuel pump and by means of an adjusting screw combined with the governor the fuel feed may be regulated instantaneously while the engine is running and, after the stroke of the pump has been adjusted to suit the load, the engine will run continuously at the same number of revolutions.

Lubrication is accomplished by means of a mechanical pressure oiler with sight feeds, which furnishes lubricating oil to all parts of the engine.

The fuel pumps have bronze bodies and checks and the plunger is of steel, case-hardened and ground. All cams and pins are also of steel, case-hardened and ground.

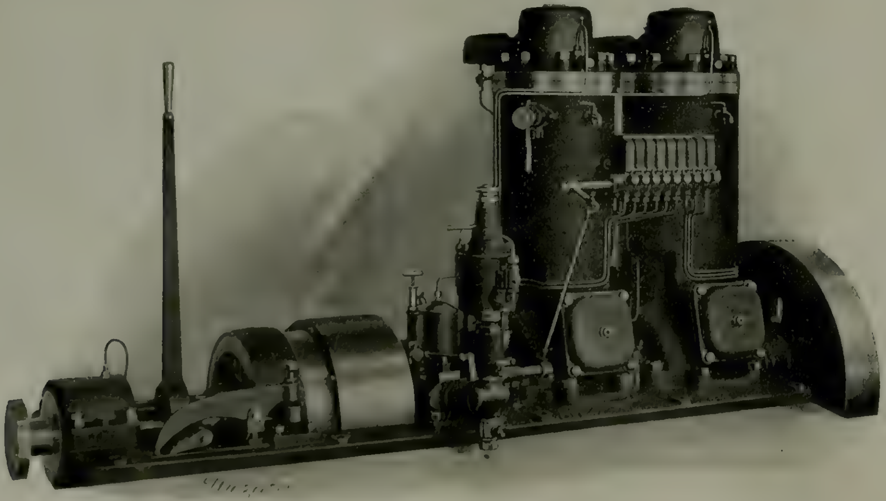
In the design of the 350 h.p. engines, a deviation has been made from the usual Skandia practice of compressing the scavenging air in the crankcase and by-passing it to the cylinders. In engines of this size it has been found to be of great advantage to have an open-base engine so that crank pin bearing may be inspected at any time without shutting down. This engine is built with an open crankcase and the scavenging air is obtained from air cylinders placed on the side of the engine at an angle of 30 degrees from the center line of the main cylinders. This scavenging air pump is operated by a connecting rod attached to the lower end of the main connecting rod. The scavenging pump discharges the air into the receiver or connecting pipes, which are located between each pump, so that in a four-cylinder engine the pump from number 2 cylinder supplies the scavenging air for number 1 cylinder and vice versa, the third and fourth cylinders operating in the same way.

During the tests it was found that these engines operate with entire satisfaction on either Calol or Diesel of the Standard Oil Company and Union Oil Company, such oils having a gravity of about 24 degrees Baume and weighing about 7½ pounds to the gallon.

Among the recent orders received for Skandia engines are one twin-screw set (2) of 175 h.p. each for delivery in Manila; one twin-screw set (2) 350 h.p. each for the E. K. Wood Lumber Co.; and two twin-screw sets (4) 240 h.p. each for the Washington Shipping Corporation of Seattle.

Skandia engines are represented in the Pacific Northwest by the Skandia Engineering Company with offices in the Grand Trunk Dock, Seattle, and in the East by H. S. Johannsen of 50 Church street, New York, who recently, among other orders, sold one twin-screw set (2) 240 h.p. each to Hannevig and Johnson for delivery in Savannah for a vessel building at that port.

The remarkable success of the Skandia engine in this country and the building up of the splendid factory for their manufacture at Oakland has been largely due to the perseverance, energy and optimism of Mr. J. H. Hansen, who has devoted his engineering skill and organizing ability to the upbuilding of the oil engine industry on the Pacific Coast. In this work during the past few months, Mr. Hansen has ably assisted by Mr. W. J. Gray Jr.



A two-cylinder Skandia engine.

A general view of the Dow plant. These shops form one of the most complete engine works on the Pacific Coast.

Proven Diesel Enters Marine Field

THE entrance of the Dow Pump and Diesel Engine Company into the manufacture of full Diesel engines for marine use has been the cause of general satisfaction throughout engineering circles. As sole licensees in the United States for the Willans and Robinson Company of Rugby, England, the Dow people have the advantage of a thoroughly tried out basis for their engine practice and at the same time in adapting the principle of the Willans design to marine usage, this concern has the advantage of many years of general engineering experience, during all of which time the name "Dow" on machinery has stood for the highest guarantee of design and workmanship.

The Dow plant is located on the Alameda side of the Oakland estuary and is one of the most complete establishments on the Pacific Coast. The property of the company faces the estuary, where there is 600 feet of deep water frontage, giving the concern cheap water transportation and ample fitting out room for vessels that come to the plant for engine installations. From a Diesel engine point of view, perhaps the most important feature of the Dow plant is the foundry equipment. There are two large cupolas, core ovens, etc., as well as Schwartz furnaces for brass and aluminum castings. A modernly equipped pattern shop and a machine shop that is well equipped with special tools and jigs secured for Diesel engine work, has enabled this concern to construct stationary Diesels that have given an excellent account of themselves, both in small and large sizes, in the matters of economy and low upkeep costs. In this connection it is worthy of note that the Dow Pump and Diesel Engine Company has exercised the utmost caution and spent much money and no less valuable time in careful study and experiment in adapting the Willans engine to marine uses.

The Dow-Willans marine engine is essentially the same as the Dow-Willans stationary unit with, of course, the reversing mechanism with its extra cams and levers added. The lubrication problems peculiar to marine practice and the other problems connected with marine service which have so often proven a stumbling block to builders of stationary engines, have met intelligent treatment in the Dow Diesel, as might well be expected from a concern with so many years of marine experience in other fields to its credit.

Complete designs, patterns and jigs are on hand for the following standard models of the Dow-Willans marine Diesel:

B. H. P.	No. of Cyls.	Inch Bore.	Inch Stroke.

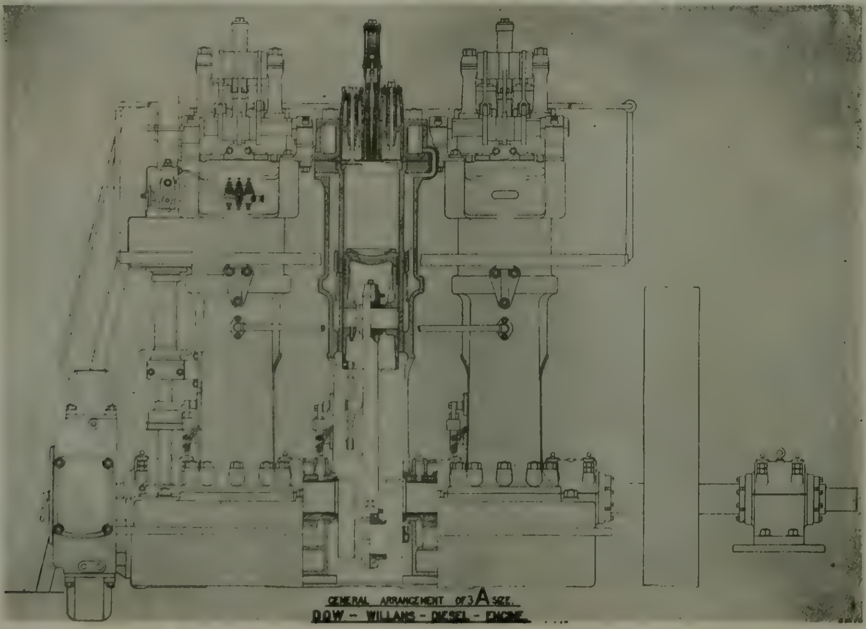
A Dow stationary Diesel on the test stand at the big Oakland plant of the Dow Pump and Diesel Engine Works.

Main bay of the machine-shop at the Dow Pump and Diesel Engine Works. A large number of pump parts are shown on the floor.

160	3	12	18.1
220	4	12	18.1
330	6	12	18.1
250	3	15	22
335	4	15	22
500	6	15	22
700	4	20	28.3
1000	6	20	28.3

It will be noted that used in single or twin screw installations this list of sizes gives a wide variation between 160 and 2000 horse-power, practically covering the necessities of every class of auxiliary and full powered cargo craft. The engine is A-framed with removable oil tight splash guards around the crank cases. These guards can be removed easily and safely without stopping or slowing down the engine. The pistons are of the trunk type, the advantages of this being reduced engine height and a saving in weight due to the absence of cross-heads and cross-head guides.

In the Dow engine the cylinder heads are detachable, carrying the brackets supporting the rockers that operate the valves. The single cam shaft, carrying both the ahead and astern cams is on the level with the cylinder tops. The cams work on the hardened steel rollers of the rocker arms direct, there being no push rods. A vertical shaft driven off the forward end of the crank shaft, operates the cam shaft through helical gears which are inclosed. The engine governor and the fuel oil pump are actuated from the vertical shaft, the one oil pump serving all the cylinders. Governing is effected by controlling the fuel supply to the injection valves and is accomplished by the Dow


GENERAL ARRANGEMENT OF 3A SIZE.
DOW - WILLANS - DIESEL - ENGINE

centrifugal governor. The range is from full speed to thirty-five per cent of full speed and the regulation, it is claimed, is precise and exact, the variation from predetermined speed being negligible. The engines can be started on a pressure of 200 pounds of air, although higher pressures would ordinarily be used. The standard air flasks furnished with these engines have each a capacity of from twenty to thirty reversing operations, depending of course upon the care of the engineer in manipulating the machinery.

The air compressor is driven off the forward end of the crank shaft and is of the Reavell type, being three-stage with cylinders and coolers entirely immersed in water. This same type of air compressor is common in many foreign types of Diesel engine.

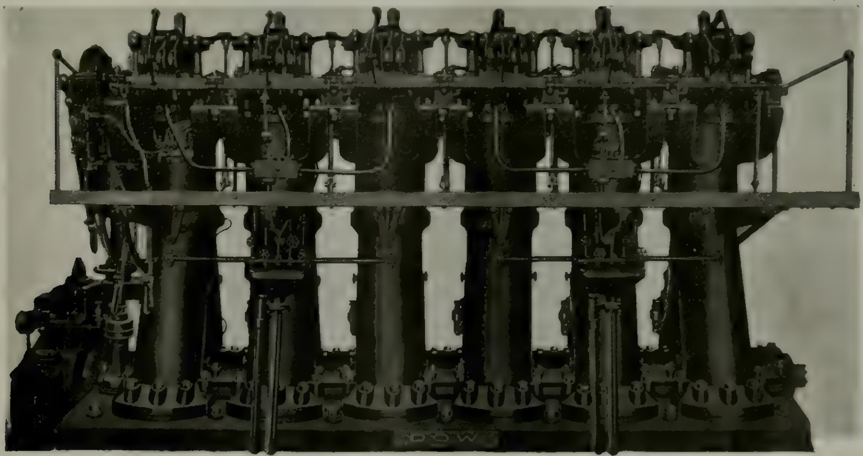
The Dow-Willans engine in its stationary form is familiar to San Francisco engineers, a great deal of interest having been manifested in the performance of the 200 horse-power units installed in the National Ice and Cold Storage Company's plant in San Francisco. In a full load test of one of these engines the following results were obtained from a series of indicator cards:

Revolutions per minute	250
Indicated horse-power	259.52
Mechanical efficiency assumed from curves	75.73%
Brake H. P.	196.75
Total fuel consumed, six hours' run, pounds	485.75
Heat value of fuel in B. T. U.	19,649
Fuel consumption per I. H. P. hour pounds	.3119
Fuel consumption per B. H. P. hour, pounds	.4114
Heat units supplied per I. H. P. hour	6,129
Heat units supplied per B. H. P. hour	8,083.6
Thermal efficiency on basis of I. H. P.	41.5%
Thermal efficiency on basis of B. H. P.	31.48%

The entrance of the Dow Pump and Diesel Engine Company, or to be more exact, the Dow Pump Works, into the manufacture of a high-class Diesel engine was only undertaken after several years of special preparation for the work. This concern had built an enviable record for itself in pumps for land and marine uses and also in mining machinery and could only afford to bring out a Diesel engine that would sustain their previous engineering record. Over four years ago, the heads of the concern went to Europe, spending many months in the various centers of Diesel engine activity both in Great Britain and the continent and the results obtained from Dow-Willans stationary installations have proven the thoroughness with which the problems incident to the production of a successful engine for using heavy oils have been met. That the marine Diesels of the same firm will also prove themselves both economical and reliable under the working conditions peculiar to the sea may be confidently predicted.

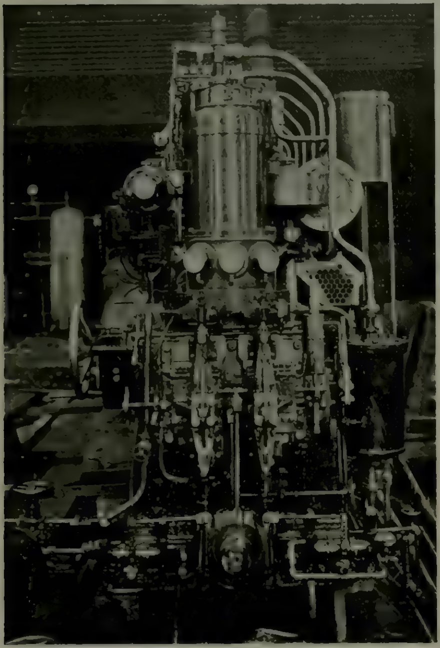
The Netherlands-Rotterdam Lloyd have announced a San Francisco service to be operated in conjunction with the Java-Pacific Line service. Six vessels formerly in the Amsterdam-Batavia service will be used and the service will be fortnightly, commencing some time in May. It is understood that the "Rembrandt" will inaugurate the service. The ships have passenger accommodations for about 200 persons each.

Elliot N. Burwell, a well known Boston naval architect, has moved his offices from the Paddock building to 156 State street, Boston, Mass.



The Dow-Willans six-cylinder Diesel for stationary work. Two large units of this class have been steadily at work in San Francisco for many months.

Recent Southwark-Harris Progress



View of a Southwark-Harris engine showing compressor, fuel feed pumps and governor.

AN ENGINE which will find serious consideration with those interested in Diesel installations during the next few months is the Southwark-Harris, for three twin screw installations are to be made in the near future for the Standard Oil Company. The first of these will be in the five-masted auxiliary schooner which Andrew Mahoney will launch for the Standard about June 15th. This schooner is to be used in carrying case oil between San Francisco and the Orient, and she will be powered with twin engines developing 150 brake horsepower each.

The Standard Gas Engine Co., which builds these engines on the Pacific Coast, is handling the installation complete, and their superintendent, Peter Mohrdieck, will design the propeller to be used. Mr. Mohrdieck is perhaps the best qualified man for this work on the coast, due to his long and successful experience on high powered internal combustion installations.

The second and third pair of engines will be installed in steel hulls, and will be ready shortly after the installation in the Mahoney schooner. These engines will be the only motive power of the two boats, both being full powered motor ships. They are four-cylinder motors with cylinder bores of fourteen inches and stroke of twenty-one inches, and develop 400 brake horsepower.

Marine engineers of the Northwest are watching with keen interest the performances of the two Southwark-Harris installations recently completed in Seattle. Both are single units developing 225 brake horsepower, being six-cylinder motors of the same bore and stroke as the four-cylinder hundred fifties which are being installed in the Mahoney boat. One of these engines is in the ferryboat "Robert Bridges," on the West Seattle run, and operates between Seattle and West Seattle. She was accepted and placed in the run last month.

The other engine is in the halibut schooner Comet owned by the San Juan Fish and Packing Co., and will fish out of Seward, Alaska. Both engines showed excellent results on their trial trips, and great things are expected of them.

Installation of the twin 400 horsepower Southwark-Harris engines for the Alaska-Pacific Navigation Company's motor ship Oregon will begin shortly, as the engines are now on their way from the factory to Seattle. This will be an installation similar to those for the Standard Oil Company's, the engines being of the same type.

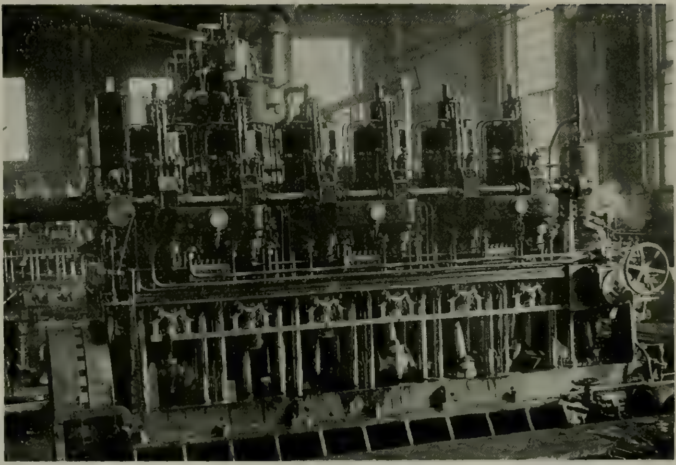
The Southwark-Harris Diesel is the pioneer in the field of valveless Diesels, and has several features exclusive to its design which have proven very successful in practice. The elimination of valves has removed one of the greatest sources of trouble in the Diesel engine, and one which has not been successfully overcome in valve types.

The adoption of the step piston or low pressure piston for scavenging and air-starting has done away with the necessity of admitting cold air into the working cylinders, and thus another source of Diesel troubles has been eliminated. Complications on the cam shaft which are unavoidable when reversing a valved engine also are removed.

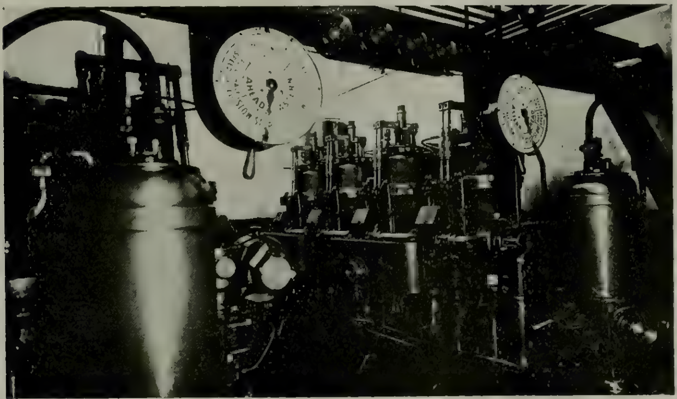
Another feature which has recommended the Southwark-Harris engine to marine engineers has been its compactness and moderate weight for the amount of power produced. Being a two-cycle engine, it naturally requires less weight and size to produce a given horsepower, and thus it has been found possible to produce an engine of high power with the strength and durability demanded in vessels for Pacific waters, without excessive weight. In these days of high freight rates every hundred weight saved counts in the earning capacity of a ship, and all dead weight saved gives the vessel that much more capacity for cargo.

The work of building the Southwark-Harris engine on the coast will be begun in the very near future, and Pacific Coast shipbuilders are assured of the same ideals of construction and workmanship which have made the Frisco Standard such a popular type of heavy-duty marine engine.

Not only is the Southwark being used for marine work, but several stationary installations are contemplated.

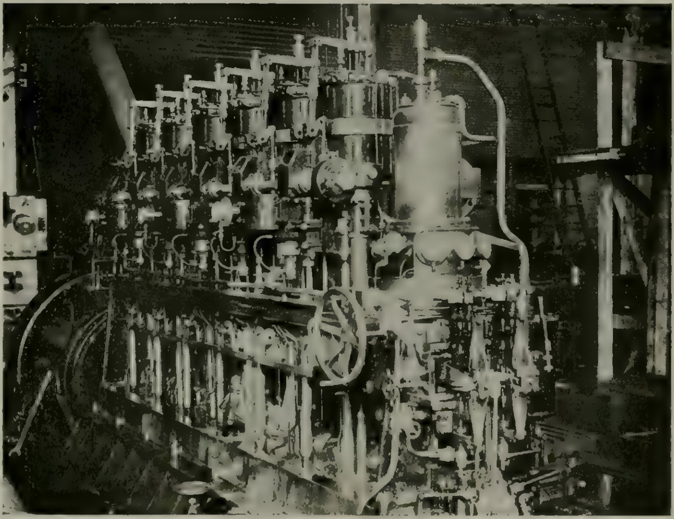


The Southwark-Harris engine for the San Juan Packing Company's motorship "Comet."



Engine-room of the motor yacht "Palisades" fitted with twin Southwark-Harris engines.

An interesting feature in connection with these installations is the average fuel saving over distillate engines of the same power, and this factor is certain to enter largely into considerations for engines of 150 horsepower and over. The guaranteed fuel consumption of the Southwark-Harris engine under full load is 0.066 gallon per horsepower hour. On an engine of 150 brake horsepower this means a consumption of 9.9 gallons per hour, against that of 15 gallons per hour on a distillate engine of the same power, a fuel consumption decidedly low and found only in the ideal distillate engine with valve-in-the-head operation, but the consumption guaranteed for Standard engines.



Engine of the "Robert Bridges," showing reversing lever and hand control wheel.

With distillate at 11 cents and fuel oil at 3½ cents this means an hourly saving of $1.30, or a saving of $31.20 per 24-hour run. Heretofore this saving has been offset by the superior reliability of the distillate engine over the Diesel and hot-bulb types, but with the development of an engine of reliability which the Southwark-Harris is proving to be, operators are gaining faith in this type. The saving in operating expense over steam in similar powers is even greater, for fireroom expenses are eliminated and cargo space gained.

In small powers and up to 120 horsepower the distillate engine continues to be the more satisfactory, for it is tried and has proven reliable through years of test and service, but the coming of the Southwark-Harris, which has eliminated the serious drawbacks of the Diesel, the admission of cold air to the cylinders and valve difficulties has brought to American ship builders an engine as reliable as the distillate type, and one on which the operative savings will more than pay for the outfit within two years' time.

Another feature which has worked out to advantage with the Southwark-Harris and made it an ideal installation for ferryboat work is that it can be started under load, just as a steam-engine, a feature which is possible in no other Diesel or combustion engine. This is due to the fact that the step piston operates as an air motor in starting, and has the same effectiveness as steam. The air motor can be used as long as the operator wishes in conjunction with the oil or alone, without interfering with its duties as a scavenging agency for the cylinders, and until the engine is carrying the full load on oil, does not need to be cut off.

The entire control centers in a hand wheel, and no matter how large the engine, this wheel can be spun without effort.

Positive governing of the engine through control of the oil supply makes it impossible for the engine to race when suddenly released from load, and this feature will work tremendously to its advantage when a boat is operating in a heavy sea and the propeller is clear of the water at times.

The right-hand engine for the Mahoney installation is on exhibition at the shops of the Standard Gas Engine Company, and is proving of great interest to marine engineers of the Bay district. The Standard plant is at King and Denison streets, in East Oakland, and is reached via the Seventh Street car from Oakland mole. The station is Twenty-third avenue.

New Firm Enters Marine Engine Field

AN announcement that is warranted to create widespread interest in the distillate and internal combustion engine fields on the Pacific Coast is that Mr. C. C. Kriemler and Mr. Richard Froboese have formed a partnership with the purpose of manufacturing distillate engines and later on internal combustion engines to use heavy oils.

Neither of these gentlemen need any introduction to Western engine users. Mr. Kriemler was with the Standard Gas Engine Company for thirteen years at the head of the sales department of that concern and latterly performed the functions of a general managership. His wide knowledge of the gas engine business, coupled with strict business integrity, has made countless friends for Mr. Kriemler up and down the coast, and he carries into his new venture the good wishes and good will of both engine users and engine makers.

Mr. Richard Froboese brings a rare engineering skill to the combination. For years he was the mechanical engineer for the Corliss and Imperial engines and later was with the Standard Gas Engine Company in a similar capacity. Froboese has always been a keen student of the distillate engine and several different makes of gas engines on this coast bear the impress of niceties of design for which he is responsible.

The new firm will be known as the Acme Engine Company and it is proposed to secure a plant site near San Francisco and build and equip a thoroughly up-to-date factory. Standardization of engine sizes, giving a maximum of interchangeability of parts, is being carefully worked out, the plans contemplating but four different cylinder bores and four different strokes in sixteen standard power units.

While we have not yet seen the plans of the new engines, we understand that the cylinders are to be cast separate, that the engine will have an enclosed base and enclosed overhead valves. The pistons can be drawn out from the bottom without removing the cylinder heads and the heads will be removable without taking down the exhaust manifold. Wherever possible, parts will be made to jig with the result that parts will not only be interchangeable in the same engine, but many of the parts will fit in several different powers of engine.

It is the intention of the firm to handle a well-known four-cycle, full Diesel engine on this coast. The name of the engine, however, has not yet been divulged. In order that it may serve its marine clients in as full a manner as possible, the Acme Engine Company has secured the California agency for the electric winches of the Pacific Machine Shop and Manufacturing Company, which have so recently secured the interest of all ship owners.

* * *

Mr. E. T. Klippert, Vice-President of the Eckliff Circulator Co., Detroit, is making a tour of the Pacific Coast States in the interests of business. While on the Coast, Mr. Klippert will inspect installations of Eckliff Circulators recently completed there, including several in the large tankers now building for the Standard Oil Co. of New Jersey.

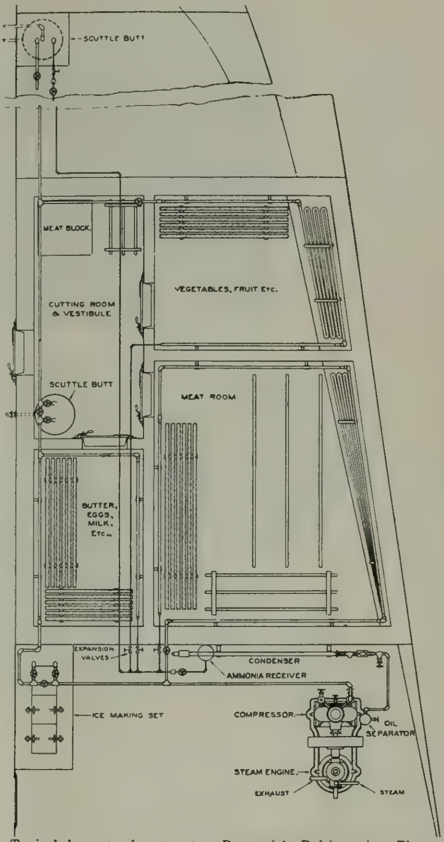
REFRIGERATION ON SHIPBOARD

Refrigeration by means of ice is costly and its cost is subject to wide variations in cases where ships are not on regular runs, in which case their supply of ice may become exhausted at ports where the price of that commodity is very high. In connection with the savings affected by the use of mechanical refrigeration for the supplies of the ordinary cargo steamer, the Brunswick Refrigerating Company have been able to secure some interesting approximations. In order to get at the saving it was necessary to average up the cost data from a large number of steamers, since it is patent that the price of ice will vary so greatly as to preclude any exact figuring. The annual purchases of ice for a large cargo steamer is taken at $1,000 and from this is deducted $200 to cover the power consumed by a refrigerating machine and its upkeep and repair bills. This would give us a saving of about $800 per annum. It is interesting to note, also, that averaging up a large number of ships' stewards statements in regard to meat ice box wastage on meats the result seems to indicate that the saving in meat just about equals the saving in ice or an additional $800 per annum. The melting ice in an ice box creates damp air and a fungus growth is started on the exposed edges of meat. These blackened bits of meat are naturally trimmed off and thrown away when the meat is prepared for cooking in the galley. Mechanical refrigeration has just the opposite effect upon the air in the refrigerating boxes that ice does. The moisture in the air is drawn to the cooling pipes and is there frozen, the air becoming very dry.

Still another advantage of the Brunswick refrigerating machine and a feature that is utterly impossible with ice, is the regulation of the temperature in different boxes at the best point for different commodities; for instance, the daily meat box should be kept at from 34 to 38 degrees F., vegetables at from 40 to 45 degrees, butter and eggs at from 32 to 36 degrees and meats for return trips or to be used at some time in the future at from 18 to 24 degrees.

The Brunswick machine is very common on shipboard along the Pacific Coast and also in the offshore service. An example may be found in the new Matson liner "Maui," described elsewhere in this issue, where three 10-ton Brunswick machines are installed in one of the engine room wings and a very extensive system of cold storage apartments, both for ships stores and refrigerated cargo, is maintained. A large 'tween deck space on this ship is also cooled for the carriage of fresh fruits.

When the low initial cost of these machines, the savings affected and the added welfare of the crew are all considerd, it is not at all surprising that mechanical refrigeration has become so general on shipboard.



Typical lay-out of a two-ton Brunswick Refrigerating Plant aboard ship.

The Brunswick machine is handled in the Northwest by the Pacific Ice Machine and Supply Company of 73 Madison street, Seattle, and is meeting with a ready welcome from both shipowners and shipbuilders throughout that section.

The Pacific Ice Machine and Supply Company has recently closed contracts to equip the following vessels with Brunswick refrigerators: Nine of the B. Stolt Nielsen ships, two Standard Oil tankers and several other vessels building at the Skinner & Eddy Corporation shipyard; two of the Standard Oil tankers building at the Ames Shipbuilding Company, two Ward liners and a Luckenbach freighter building at the Seattle Construction and Dry Dock Company plant, three vessels building for the Pacific American Fisheries at Bellingham, Washington. In addition to these new vessels the "Baja California" for A. O. Lindvig & Co. of Kragero, Norway, and the "Spokane" and the "City of Seattle" of the Pacific Steamship Company fleet have also been fitted with Brunswick refrigerators through orders secured by the Pacific Ice Machine and Supply Company.

H. W. d'Evers (left) and Carl Sunde (right), Proprietors of Sunde & d'Evers.

New Quarters for Chandlery Firm

A Seattle firm which has recently undergone a big expansion is that of Sunde and d'Evers, ship chandlers. Carl Sunde is one of the pioneer sailmakers and ship chandlers of the Pacific Coast, having been brought up in the business by his father, a well-known sailmaker of the early days. In 1882 the firm of Tickle and Sunde started in business in Seattle and in 1902 this firm moved to commodious quarters in the Colman dock.

W. H. d'Evers learned the ship chandlery business in the well-known Chicago firm of George B. Carpenter Company, becoming sales manager and making frequent visits to the Pacific Coast in this capacity. In 1913 the firm of Sunde and d'Evers was formed.

When the front of the Colman dock at Seattle was remodeled, Sunde and d'Evers had the entire store space on all three floors arranged to meet the special needs of their business with the result that they now possess as complete a ship chandlery establishment as is to be found on the Pacific Coast.

With 18,000 square feet of store and work space and an additional 10,000 square feet of warehouse space, a regular staff of forty employees, exclusive of men handling the contracts for rigging large vessels, the Sunde and d'Evers establishment is prepared to supply every necessity for the fisherman, the boat owner or the big ship owner. A complete line of marine supplies is carried constantly in stock. They are outfitters for the fishing fleet and salmon canneries. They carry a complete line of small boat fittings in brass for the pleasure vessels and in galvanized for the work boats. But the greater part of the business is the supplying of ship-hardware in the equipment of ocean-going vessels, especially those being constructed on the Pacific Coast.

The sail and rigging lofts run the entire length of the upper story of the building and are up to date in every detail. They are the scene of constant activity, for here canvas is turned into sails, tents, awnings, hatch covers, tarpaulins, buckets, lifebuoys, and innumerable articles, and here also wire and manila rope and rigging of all kinds and sizes are spliced, parceled and made ready for the ship.

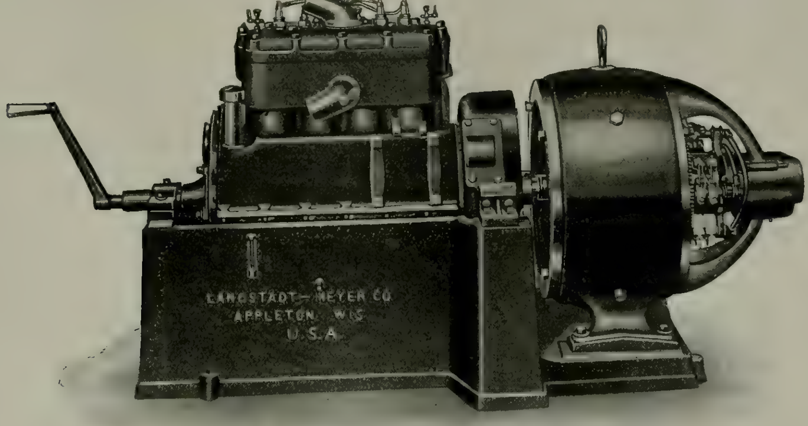
The Wilson Brothers' shipyard at Astoria has been taken over by a new organization, the Wilson Shipbuilding Company, with a capital stock of $100,000. Added capital for expansion purposes was the cause of the move.

The Rolph Shipbuilding Company will shortly start construction work on three two-decked double ended steamers of 2500 tons gross and one five-masted barkentine with a lumber capacity of 1,600,000 feet.

Views Showing Some of the Interesting Departments in the Big Ship Chandlery Store of Sunde & d'Evers. At the left hand side are shown two views of the sail loft and on the right is the Men's Furnishing Dept.

A HANDY GENERATING SET

The evolution of the Langstadt-Meyer direct-connected generating units has occurred through the demand for a light, serviceable electric power plant of small capacity that would couple simplicity with durability and reliability. The result has been an electric unit that is exceedingly well adapted to many marine uses, especially in those cases where intermittent service is required.



Langstadt-Meyer Direct-Connected Generating Set.

These self-contained generating sets, of course, have a great advantage over belt-driven dynamos in the matter of space occupied and also operate at a much lower speed than is customary with a belt drive. This low speed is conducive to long life, both in the dynamo and the engine. The governing arrangement is sensitive but sure. The governor is of the centrifugal type and governs the speed by throttling the gas entering the intake manifold.

The cylinders of the engine are cast enbloc with the upper half of the crank case from a special grade of reverberatory air furnace iron. The cylinder head is one casting and easily removed, exposing all the valves and pistons. The valves are enclosed and are made with carbon steel stems welded to cast iron heads. The valves are large in size with moderate lift and the mushroom push rods have easy action on the cams. Enclosure insures quiet running and thorough lubrication. The pistons are cast from the same grade of iron used in the cylinders and are ground to size.

The cam shaft is a drop forging of low carbon steel, the cams being integral with the shaft. After being turned, this shaft is heat treated and ground to size. The crank shaft is of large diameter, insuring ample bearing surfaces and is made of three per cent nickel steel heat treated. The flange for connection to generator coupling is forged integral with the crank shaft. The shaft is accurately balanced to insure smooth running.

A plunger pump in the base of the engine forces oil under pressure to all bearings and keeps oil at

WHITE BROTHERS
HARDWOOD
LUMBER
TIMBER
FLOORING
VENEERS
PANELS
INDIANA BENDING OAK-TEAK-ASH
WHITE CEDAR-IRON BARK-MAHOGANY
– – – LONG OAK KEELS – – –
EASTERN WHITE AND RED OAK, ETC.
THE LARGEST STOCK OF HARDWOODS IN THE WEST
FIFTH and BRANNAN STREETS
SAN FRANCISCO, CAL.

a fixed level in each crank pit. Cooling is accomplished either by a thermo syphon system or by a circulating pump. For portable plants a specially designed radiator and fan are supplied, both of which are integral with the machine.

The Atwater-Kent Unisparker is usually furnished with these plants, but magneto ignition can be supplied if desired.

Good ventilation throughout the armatures and fields and liberal carrying capacity of conductors insure low operating temperatures, the ratings complying with the standard specifications laid down by the American Institute of Electrical Engineers. The generators are furnished either compound or shunt wound. The bearing is self-aligning, ring oiling and of large working surface and is made of high-grade phosphor bronze. The brush holder is of the box type, insuring noiseless operation, maximum current capacity and non-heating.

The uses of such a generating set as the Langstadt-Meyer in the marine field are apparent. As the complete electric plant for a small yacht or motor ship they leave little to be desired, being of comparatively light weight for the power delivered and taking but little space. As a stand by source of power for electric lights or for wireless on large vessels the plant is an ideal one and should appeal to owners.

In the Navy or any other place where a portable search light is needed the Langstadt-Meyer direct connected generating sets furnish as simple and reliable source of power as can be devised. These sets are being handled by the Crisp Engineering and Equipment Company of 24 California street, San Francisco.

MARINE MISHAPS

"GOLDEN GATE"—Str. The hull of this steamer, previously reported sunk at Ensenada, has been towed to San Diego with some of the cargo, which is in very bad condition.

"LANSING"—Str. From port San Luis, March 6, for Juneau, had extremely heavy weather both north and south bound and suffered considerable damage.

"PRINCE RUPERT"—Br. Str. Ran ashore, March 23 on Tenn island, British Columbia. She was floated on April 20 and taken to Esquimalt for repairs.

"SAGINAW"—Str. From Everett, March 28, for San Francisco with a cargo of creosoted piles. Broke her tail shaft March 31 and was towed to San Francisco by the Str. "PHOENIX." Both ship and cargo insured locally.

"ISAAC REED"—Barge. From Comox with a cargo of coal for Honolulu, in tow of the tug "HERCULES," sprung aleak and was towed into San Francisco for repairs. Only a slight caulking necessary.

"EDWARD R. WEST"—Schr. From Vancouver, November 1, for Delagoa Bay, put into Cape Town, March 27, in a leaky condition.

"HARRIET G."—Bg. From Port Ludlow with lumber for Honolulu, was dismasted on April 8 off Cape Flattery. She was abandoned by the crew and later picked up by the fishing schooner "SUMNER" and towed to Neah Bay. The crew was subsequently landed. Value of vessel and cargo in damaged condition approximately $5500. Salvors are demanding 60 per cent.

"RAYMOND"—Str. Previously reported ashore near Point Sur; has been floated and taken to San Francisco for repairs.

"WESTERNER"—Str. From Columbia River, April 15, for San Francisco, was run into in San Francisco Bay, early in the morning of April 18, by the ferry steamer "NEWARK" and had her stem twisted. The "NEWARK" was not damaged.

"WM. F. HERRIN"—Str. At Portland, March 21, from Gaviota, had rudder stock damaged and was docked for repairs.

ON April second the Fireman's Fund Insurance Company, through its board of directors, announced the retirement of Mr. Bernard Faymonville from the Presidency of the company in the following terms: "In the thirty-five years during which he has successively filled the office of Special Agent, Assistant Secretary, Vice-President and President of this company, Mr. Faymonville's untiring industry and unvarying courtesy has made him hosts of friends, who will join us in regret that impaired health makes his retirement necessary and in the earnest hope that relief from the cares of active business may in due course restore him to full health. Mr. Faymonville will retain his connection with the company as an active member of the Board of Directors. The board wishes further to announce that Mr. J. B. Levison, formerly Vice-President, was elected President of the company and that Mr. Charles P. Eells, General Counsel of the company, was elected Vice-President. Mr. Levison, who succeeds to the Presidency of the company, is an underwriter well known throughout the United States. He has for the past twenty-six years been actively connected with its management, successively as Marine Secretary, Second Vice-President and Vice-President. Mr. Eells, an attorney of eminence, for ten years past has been a member of our Board of Directors, and for thirty years its legal adviser."

Mr. W. H. Alison, superintending engineer for the Pacific Steamship Company and previously the Pacific Coast Steamship Company, retired from that office on April 15. Mr. Alison is one of the best known steamship engineers on the Pacific Caost. Alison was a product of the old Risdon Iron Works. His first sea experience was on the "Oceanic" of the Occidental and Oriental Steamship Company as a junior engineer. After three years service in the engine rooms of Pacific Mail boats, Alison went to Philadelphia in 1882, returning to this coast as second engineer on the "Queen of the Pacific." He remained steadily in the service of the Pacific Coast Steamship Company after that time, becoming superintending engineer in 1904. Mr. Alison's retirement will be looked upon with regret by countless engineers and steamship men up and down the coast, as he was universally recognized as a man of exceptional ability, both as an engineer and a department head.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912,

of Pacific Marine Review, published monthly at San Francisco, California, for April 1, 1917.

State of California, City and County of San Francisco—ss.

Before me, a Notary Public in and for the State and county aforesaid, personally appeared F. M. Dickie, who, having been duly sworn according to law, deposes and says that he is the Editor of the Pacific Marine Review, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Name of— Postoffice address—

Publisher, J. S. Hines, 576 Sacramento Street, San Francisco, Cal.

Editor, F. M. Dickie, 576 Sacramento Street, San Francisco, Cal.

Managing Editor, F. M. Dickie, 576 Sacramento Street, San Francisco, Cal.

Business Managers, J. S. Hines and M. D. R. Hines, 576 Sacramento Street, San Francisco, Cal.

2. That the owners are: (Give names and addresses

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3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is (This information is required from daily publications only.)

F. M. DICKIE, Editor.

Sworn to and subscribed before me this second day of April, 1917.

(Seal) S. J. Clark, Notary Public.

(My commission expires February 15, 1921.)

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PACIFIC MARINE REVIEW

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JUNE 1917

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PACIFIC MARINE REVIEW
The National Magazine of Shipping

VOL. XIV, No. 6 SAN FRANCISCO JUNE, 1917

The Opportune Moment

IN the April issue of the "Pacific Marine Review" appeared a short article under the title "A Maritime Congress—Why Not?" which has attracted considerable attention and brought forth commendations from a large number of prominent shipping people. At the time this article was written (the latter part of March) our country was not at war, and our entry into the world struggle naturally led us to consider very seriously whether it was wise to carry out a propaganda such as was outlined in that article during a time when the country was at war.

A careful consideration of conditions as they exist today, however, will naturally lead one to the conclusion that there is no more opportune time for a maritime congress than the present. At no time since the days when our country was a mere fringe along the Atlantic Coast has our population shown such a keen interest in shipping matters. The war is the natural topic of discussion from one end of the country to the other, and no one can discuss the war without talking about ships. England, France and Italy are asking for ships, the United States is building ships at a rate no one dreamed of two short years ago, and our Government may at any moment start commandeering ships. Could any time be more opportune, then, for a coalition of the interests involved in shipbuilding and shipowning?

We have entered upon a great war in which the paramount problem is transportation. Our Government is seeking to overcome the German submarine menace with the stimulation of ship building both in wood and steel. The Government will not stop here, however, but will resort to the wholesale commandeering of ships. It is the duty of every shipowner to stand back of his Government with every ton of shipping under his control, but it is no less his duty to see that his Government has the advantage of his accumulated experience. We must expect and accept certain errors in judgment on the part of the officers entrusted with the selection of tonnage for Government use, but the shipowner is called upon by his patriotism as well as by self-interest to seek every possible means of preventing the Government from making serious blunders in regard to shipping.

One of the peculiarities found in Government boards is a tendency to show great celerity where there should be deliberation, and vice versa. This tendency may manifest itself in the handling of the shipping problem through commandeering ships in haste and using them at leisure. A ship may be taken over by the authorities and held in waiting for a period that might have been profitably occupied in one or two additional round trips on her established trade route. To help the Government avoid such a condition is the duty of every shipowner, and to do this the shipowners should be organized with the shippers and shipbuilders into a body capable of formulating fair and reasonable conditions around the commandeering of ships and powerful enough to make its influence count for both the material and military welfare of the country.

Alaska's Grand Tour

A NEW country is always interesting and in many respects there is no newer country on the face of the globe than Alaska. As long as this great territory was measured by the commercial world solely in figures detailing its fish and fur resources, its vast interior and wonderful stretches of navigable waterways remained a "no man's land" peopled by a few Indian tribes and a slender sprinkling of hardy missionaries. The discovery of gold in the Klondike in Canadian territory and the subsequent finding of the precious metal in widely separated localities on American soil caused a remarkable and almost immediate revolution in Alaskan life. Widely separated mining camps required transportation of supplies, and later on, when quartz began to supercede placer mining, transportation took on a twofold importance. Copper followed hard upon the heels of gold, and finally the possibility of working vast coal deposits gave birth to short railroads, the beginnings of systems that will at a not far-distant date supplement the great interior water arteries of our northern domain.

The casual tourist who has taken the steamer north from Seattle through the wonderful inside passage, an endless archipelago of mingled forest and glacier, flanked on the mainland by a great mountain barrier, little dreamed that directly to the eastward of these mountains started a vast system of waterways which finally emerged, after passing through Canadian territory and traversing the heart of Alaska, into the Behring sea. This geographical condition permits of Alaska laying claim to a "grand tour" which can hardly be equaled in any other land—a journey for thousands of miles through the heart of a new country.

The purchase of Alaska in 1867 brought forth a storm of criticism on the grounds that there was nothing to purchase but ice-fields and seals; but even if this preposterous opinion had been true, Alaska would still have proved a good investment, since the government bounties on fur seals alone more than repaid the purchase price. Alaska, a territory of nearly 600,000 square miles, is rich in natural resources, and, contrary to popular belief, a large part of its seacoast is accessible both in winter and summer. In fact, every harbor from Ketchikan to Dutch Harbor is open continuously, and the two principal railroads operate the year round. The last "open the year round" port is Dutch Harbor, 1700 miles north of Seattle, and here the Government is to establish great coal depots.

The construction of 1000 miles of government railroad will open up a vast area of the interior country, hitherto untouched and suspectible of agricultural development, and as a whole the country is well supplied with minerals and some of it well wooded. There are several railroads in operation, but most of these serve some individual industry or a limited stretch of territory. Alaska's commerce is now in the neighborhod of $75,000,000 per annum, and to date our country has been enriched by our northern domain to the extent of over $600,000,000. Surely the purchase of this "barren waste of snow and ice" for the paltry sum of $7,200,000 was a good business deal.

The steamer "Susie" at Tanana. The Alaskan river steamers are comfortable craft.

Alaska's grand tour starts at the little seaport of Skaguay, the gateway to the interior of Alaska and the Yukon and the southern tidewater terminus of the White Pass & Yukon Route. From this town, the first leg of the journey is made by train over a remarkable bit of railroad that winds up the Skaguay river gorge, with the old trail of the early miners clearly visible in many places.

About 19 miles from Skaguay the train crosses Dead Horse Gulch on a steel cantilever bridge, the main structure being 400 feet long and 225 feet high, with 435 feet of trestle-work approaches. This is the most northerly bridge of its kind in the world and speaks volumes for the perseverance and courage of the railroad engineers who installed the railroad.

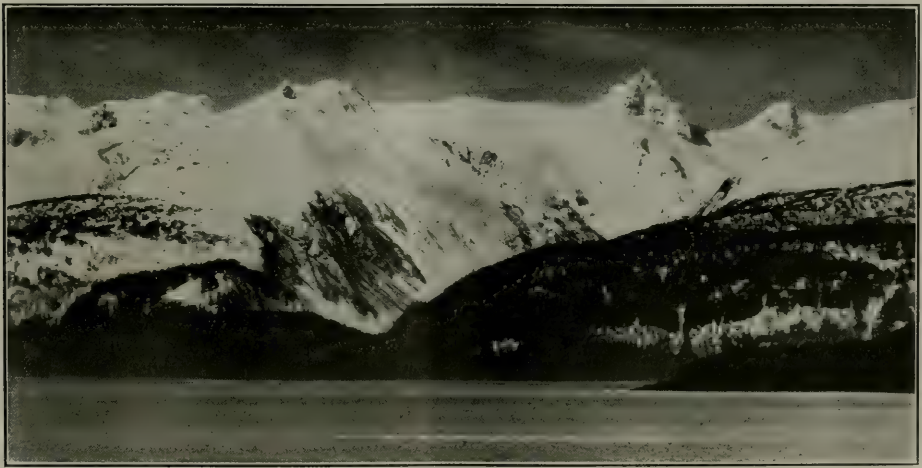
A little over twenty miles from Skaguay and at an altitude of 2885 feet is White Pass summit, and the international boundary is crossed into Canada. There is a small mountain lake here whose waters flow into the Yukon and hence for 2100 miles into the Behring sea; thus Alaska's great river system has its source but twenty miles from the ocean. Forty miles from Skaguay is the small town of Bennet, situated on a beautiful lake of the same name, and formerly of considerable importance as a starting point for the trails to the Atlin gold-mining district some ninety miles southeast. Bennet once boasted a population of 15,000, and here barges and scows were constructed in large numbers for the freighting down stream to Dawson. Across the lake from the railroad tracks the mountains rise sheer for five thousand feet and the train winds along the shore until, at a total distance of sixty-seven and a half miles from Skaguay, Lake Bennet narrows to a river and is crossed on a steel bridge. This station, known as Caribou Crossing, is the starting point for the side journey to Atlin.

Steamer "Whitehorse" in the sunset on Lake Le Barge.

A comfortable lake steamer, the "Tutshi," is used for the Atlin run. This steamer first passes through Lake Nares and then enters Tagish lake at what is known as Windy Arm. Running down this arm for ten miles, the steamer rounds a promontory into the Taku arm of Tagish lake. This run and the run up Taku inlet to the portage landing consumes a large part of the night, and the next morning the train is taken across the portage to Scotia bay on Lake Atlin. The steamer "Tarahne" then carries the traveler across the lake to the town of Atlin, where a fine hotel has been built which serves as a starting point for innumerable short jaunts into what is perhaps as wonderful a bit of mountain and lake country as there is in the world. The return to Caribou Crossing is made on a schedule which is arranged so that the boat passes in the daylight the waters traversed in the nighttime on the up-trip.

From Caribou Crossing, or Carcross, the journey is made to Whitehorse by rail. This section of the country is more level and the lakes less numerous. For the last few miles of the rail journey the famous Miles Canyon and the White Horse Rapids which proved so dangerous to the early pioneers are glimpsed.

Whitehorse is 110 miles from Skaguay and lies


Snow Mountains from the Lynn Canal. The Alaskan coast scenery exceeds in grandeur even that of the north coast of Norway.

The river steamer "Tanana."

at an elevation of 2079 feet. Whitehorse is an important little town at the head of southern navigation on the Yukon river system. Here the various steamers on the upper Yukon take on freight and passengers for Dawson and other river points below. The summer weather is delightful and the surrounding scenery well repays those who hunt it out. An unusual feature is the evening games, baseball and tennis being generally indulged in from 8:30 to 10:30 in the evening.

The start down the Yukon is made on a river steamer from Whitehorse, the river widening out twenty-five miles below into beautiful Lake Le Barge. The twilight ride of thirty-four miles on this lake is an extremely beautiful one. Leaving this lake, a stretch of the Yukon known as Thirty-Mile river is entered. After this extremely tortuous stretch of river navigation, another stretch of river called the Lewis river is traversed. Some of the points of interest en route are Hootalinqua, a Northwest Mounted Police and trading post; the Big and Little Salmon rivers, and the Tantalus coal mine, one of the earliest coal strikes in the Yukon Territory, coal being first mined here for commercial purposes in 1902. The coal from these mines is transported in barges to Dawson and Whitehorse, much of it being used by the White Pass & Yukon Railway.

Soon after leaving Tantalus, Five-Finger rapids is reached. The name is derived from the five great rocks that divide the river into narrow channels, through one of which the steamer races. Below Five Fingers is Rink rapids, and a short distance beyond the point where the winter stage-trail crosses the Yukon, and then follow Minto and Selkirk. The latter point is of great interest as the site of the Hudson Bay Company's first trading post on the Yukon, being established in 1861. It has been abandoned by the fur company and is now used by the prospectors, trappers and hunters of the district for business and social gatherings.

The "Herman" with barges in tow.

After leaving Selkirk, several trading and mining posts, such as Isaac Creek, Kirkham Crossing, Stewart and Ogilvie, are passed. Forty-seven miles below Ogilvie is the city of Dawson, the objective point of the thousands who sought the gold diggings of the Klondike. From a city of approximately 30,000 inhabitants it has dwindled to less than 3000. Dawson is still of importance, however, despite its empty shops and houses, and gold dredging in this locality has become quite an industry.

Mr. A. F. Zipf, Traffic Manager of the White Pass & Yukon Route, talking navigation to Mr. Smythe and Captain McKenzie.

We have now traveled a distance of 460 miles by steamer from Whitehorse and are at an altitude of about 1200 feet. From Dawson an Alaska-Yukon Navigation Company's steamer is boarded, and the first point of interest below Dawson is Forty Mile, where the Canadian customs house is located, which clears goods for shipment on into Alaska. Seven miles farther, on Coal Creek, is where the coal ledges are plainly visible along the river bank. A short railroad, about four miles in length, leads from the landing back to the mining shafts. There is an electric-power plant here which furnishes power for the mines and also lights for Dawson. Just below this creek is Calico Bluff, where the monuments marking the Alaskan-Canadian boundary may be seen.

Ten miles past the boundary line we come to Eagle, and later on to Circle, the site of a trading post, U. S. Signal Corps, and postoffice. An oil station for the river steamers is also located here. At this point the "Yukon Flats" begin, the river widening out and becoming shallow, making navigation difficult. The scenery is very fine, however, the river being fairly choked with islands. The next point of interest is Fort Yukon, on the

The steamer "Susie" at a river landing. The steamboat service on the Alaskan rivers is thoroughly modern in every respect, and the boats are comfortable and fast.

Lake Le Barge. The White Pass & Yukon Route taps one of the finest sections of lake country to be found anywhere in the world.

The Alaska Packers Association's cannery at Wrangell, Alaska. The Alaskan fisheries are among the most prolific in the world.

Kilisnoo, on the bank of the Yukon. This is one of the centers of Indian population in Alaska and a point of interest to the tourist.

Skaguay is nestled in a snug little bight in the mountains.

Arctic Circle. This settlement was established by the Hudson Bay Company as a trading post in 1847, and is still a trading post, although abandoned by its founders many years ago. The midnight sun is a sight here which always proves of intense interest to the traveler. Alaskan sled dogs are also seen here at their best, and an Indian village lends a further touch of interest to the stranger.

After crossing the Arctic Circle at Fort Yukon the river bends southward and recrosses the Circle at Beaver, a small trading post and postoffice and the outlet for the mining and fur section of Chandler district to the northward. Ninety-five miles below Beaver is the abandoned post of Fort Hamlin and here the Yukon Flats come to an end and the river once more narrows and forms a deep, easily navigable channel.

About ninety-five miles below Fort Hamlin we come to one of the best known points on the lower Yukon, called Rampart. Rampart leaped into fame in 1898 on account of the rich gold diggings for which it became headquarters. The gold diggings are but a few miles back from the river, and in days gone by yielded rich returns. Across the river from Rampart is a U. S. Government Agricultural Experiment Station, where the soil and climate of Alaska are being experimented upon with quite remarkable results in the way of berries, vegetables, flowers and grain.

Ruby, on the Yukon at the opening of navigation, showing the ice breaking up and commencing to drift downstream.

The White Pass & Yukon Route hotel at Lake Atlin and the wharf at Skaguay.

About eighty miles below Rampart is the mouth of the Tanana river, the city of Tanana, and the U. S. Army post, Fort Gibbon. Tanana is a point of importance owing to the transfer of freight and passengers to Tanana river steamers. Tanana is 700 miles below Dawson by the river. Steaming up the Tanana, the first point of interest is Hot Springs, these springs being located about four miles from the river landing. After passing Tovolana, the site of a very large fox farm, and Nenana which has just sprung into prominence as the distributing headquarters for the engineers in charge of the new Government railroad system which will extend to Seward on the Gulf of Alaska, we come to Chena, the head of low-water navigation on the Tanana river and connected to Fairbanks by a ten-mile railroad. In the tourist season, however, there is plenty of water in the Tanana and the steamers proceed direct to Fairbanks.

Fairbanks is about 270 miles above Tanana, is situated on an island in the river, and is a town of about 2,000 people. The country around Fairbanks is fertile and beautiful, and the neighboring gold-mining operations are of interest. The trip down the river to Tanana is made in 48 hours, and here a change is made to another steamer for the run down the lower Yukon.

The first stop of importance below Tanana is Ruby. This is quite a large settlement and is the outlet for the Ruby mining district. About 108 miles below Ruby is Koyukuk, at the junction of the Yukon and Koyukuk rivers. The latter is a stream of considerable importance, being over 520 miles in length and tapping the Bettles mining district. There is a large Indian settlement at Koyukuk. The next point of importance is Anvik, near the mouth of the Anvik river. The last settlements mentioned are centers of Indian population, and native handiwork and carvings form an important article of barter.

Twenty-five miles below Anvik is Holy Cross, the transfer point for boats going up the Iditarod river. This stream is 320 miles in length and taps the Iditarod mining district. Marshall, the stampeding point for the latest gold discovery in the lower Yukon country, is the next point of interest reached. Sixty miles below Marshall is located Andreaofsky, established by the Russians about 1853.

At New Hamilton, 127 miles from St. Michael, the effects of the Norton Sound tides are first felt. The last thing of enthralling interest to the traveler is the glorious coloring on the high bluffs of Stephen's Pass just before reaching St. Michael. This ends the journey through the heart of Alaska. The distances traveled are 2061 miles down the Yukon and 550 miles on the Tanana river.

St. Michael is situated on an island and was established by the Russians in 1833. In 1897 the United States Government established a military reservation and postoffice on the island, and good hotel accommodations have been provided.

The opening up of the "grand tour" through Alaska was a work requiring untiring energy and implicit faith in the future of a new land. Aside from the material benefit accruing to the world through the opening of undeveloped territory, the founders of the White Pass & Yukon Route have given to the traveling public one of the most magnificent and instructive journeys to be had in the world today. They have made it possible to traverse a beautiful wilderness surrounded by all the comforts and conveniences of modern travel, and have more than done their part to make Alaska accessible to those who choose to see.

Summer and Winter: a dead whale stranded on the beach and a revenue cutter in the ice.

Early Shipbuilding on the Pacific Coast--General

By J. Wyllie

WHEN John Jacob Astor sent out an expedition from New York in 1810 to establish a post at the mouth of the Columbia river, he was moving pawns in the age-old game for the possession of new territory and its abounding wealth. Astor, however, must have been poorly informed about the resources of the new land, for included in the "Tonquin's" cargo were framed timbers for several small vessels with which to conduct trading operations on the coast. Only one of these knock-down boats was put together, the "Dolly," a schooner of about thirty tons, launched at Astoria October 2, 1811. She was found to be unfitted for outside work and was kept in the river trade. None of the outer hulls brought out were set up.

Further up the Columbia river the powerful Hudson Bay Company was also placing its kings or knaves on the outposts of empire in this four-handed game of grab and, they also requiring vessels, in 1829 a schooner of 150 tons was launched at Fort Vancouver. This vessel, which was named the "Vancouver," was employed on the coast until 1834, when she was wrecked on Queen Charlotte island. About 1830 the company launched another schooner, the "Cadboro," which was also used on the coast, one of her first trips being to California for cattle, a number of which she landed safely at the post.

In 1841 a party of young men, who wanted to go to California to purchase cattle with which to stock their ranches, built a small schooner on Swan Island near the mouth of the Willamette. Work was begun on this vessel, the "Star," by Felix Hathaway, an experienced shipbuilder, but as the partners had a greater fund of enthusiasm than cash, the builder quit before the hull was completed. The others continued the work and on May 19, 1841, the vessel was launched and taken up to the settlement at the falls to be finished. When it came to rigging the "Star" another set of difficulties confronted the prospective navigators, for although Dr. McLoughlin, the company's agent at Fort Vancouver, had aided the settlers in many ways, like all other lords of the wilderness, he did not look with favor upon private enterprise. The party tried to obtain cordage and canvas through the nearby settlers, but the unusual demand for these commodities aroused the suspicion of the Factor, who visited the party and after asserting that it was a crazy notion for a lot of green hands to put out to sea, informed them further that if they should prove successful they were liable to seizure as pirates as they had no papers. (A Narrative of Joseph Gale, in Clarke's Pioneer Days of Oregon History, pp. 17-27.)

Nothing daunted, the young men appealed to Lieutenant Wilkes of the United States Navy, then on the river with a surveying expedition, and he stood sponsor for them, arranging with Doctor McLoughlin to let them have the necessary supplies. Wilkes having satisfied himself that Joseph Gale, a member of the party, was a competent navigator issued him a sea letter or clearance. It was not until the following August, however, that the vessel left the Willamette. On September 12th she crossed the Columbia river bar and on the 17th came to anchor in San Francisco bay after a stormy passage. The "Star" was traded for 350 head of cattle and the party, increased by thirty new members, in May 1843 started north overland with about 1000 head of cattle, most of which were safely brought to the Willamette valley.

The first half century of shipbuilding on the coast had been for the purpose of colonial expansion as much as for commercial gain, but now that boundary lines were being defined and the rich agricultural lands being taken up by settlers, conditions were changed. The overseas trade could be handled by those already in the business, the immediate need was for vessels of small tonnage for coastal and interbay service and for this service schooners, sloops and brigs were soon in process of construction all along the coast. With the advent of steam the inland waterways were made available for traffic and the day of exploitation began to give way to an era of development.

While most of the early craft were constructed under difficulties from the want of proper equipment, particularly in the case of steam vessels, yet the need was great, the builders resourceful, their faith in the country unbounded and the returns on their investment of labor and capital were sufficient inducement to keep pace with the growing demand. About the middle of the century so many small craft, steam and sail, were being built that, although they were of the utmost importance to the communities which they served, only a brief mention of an all too incomplete list of pioneer vessels can be made here.

Although Vancouver Island has the honor of being the birthplace of the first two vessels built on the Northwest coast, no mention of another can be found until 1851 and this was a small iron steamer brought out in sections from England and put together at Victoria. The pioneer native built steamer for British Columbia was a fine stern wheeler for the Fraser river run, launched at Victoria in 1858 and named the "Governor Douglas."

Shipbuilding on Puget Sound began in 1853 with the schooner "H. C. Page," built at Whatcom. Later in the year the clipper sloop "Rob Roy" was built near Steilacoom. In 1854 the "Emily Parker," a schooner of forty tons was built at Olympia and the "Julia Barclay," a stern wheeler for the Fraser river trade was launched at Port Gamble September 9, 1858.

The first sea going steamer built on the Sound was the "George S. Wright," launched at Port Ludlow May 12, 1860. While on the Portland-Sitka run, the "Wright" was lost with all hands in Queen Charlotte Sound in January 1873.

In 1869 the barque "Tidal Wave," 603 tons, was built at Port Madison. I am not certain if the hull is still afloat, but the vessel's name disappeared from the register about 1909, after a record of service covering fifty years, which speaks well for the faithful work of the builders and skill of the officers who navigated the vessel through so many winters on the coast. In 1871 the "Wildwood" of 1099 tons gross, the first American full rigged ship built on the coast, was launched at Port Madison. Much of this vessel's service was in the Oriental trade, in which she made a number of smart passages. She was lost at Nushagak, Alaska, in 1887.

The California gold rush gave an impetus to boat building in Oregon and numerous expeditions set out in hastily constructed vessels, amongst them a ship's boat that had been cut in two and lengthened, but they all appear to have arrived safely at the new Eldorado. The "Alta California" of December 14, 1849, in a list of arrivals at the Columbia river, mentions the schooners "Milwaukie," "Pioneer" and "General Lane" as having been built in Oregon.

The first steam boat built on the Columbia was the "Columbia," a double-ended, side wheeler built at Astoria in the spring of 1850. The machinery was of French make and was brought from San Francisco. The trial trip was made on her regular run to Oregon City on July 3rd and 4th and though of rather crude construction the little vessel proved herself a financial success. Later in the same year the "Lot Whitcomb," the second venture in steam, was built at Milwaukie on the Willamette river. The "Whitcomb" was a larger and finer vessel than her predecessor, having been built by a regular shipbuilder, a man named Hanscombe. She was launched with appropriate ceremonies on Christmas day, 1850. In 1853 she was sold to Abernathy, Clark & Company and sent to San Francisco. Her new owners paid $50,000 for the vessel, just $42,000 more than she cost to build. (b)

In 1854 the first stern wheeler on the river, the "Jennie Clark," was launched at the Milwaukie yard. Further down the coast we find that the Umpqua river made a start in the building line with the schooners "Palestine" and "Umpqua," launched in 1856. In the following year the steamer "Satellite" was built.

The brig "Arago" of 186 tons, launched at Simpson's yard at North Bend on Coos bay in 1856, was the first of many fine vessels turned out at one of the best known yards on the coast. Up to 1870 this firm had turned out seven schooners, three barkentines and three brigs. The crowning work of Simpson's yard was the ship "Western Shore" of 1188 tons register, built in 1874. She was designed by A. M. Simpson and built by John Kruse and was a fine ship and handsomely finished. Her spars were said to be the finest ever seen in Liverpool, which was commendation of the highest order, coming as it did from that famous port on the Mersey, which, in the palmy days of sailng ships, was the trysting place of the nations, when sailors' good-byes to brother mariners the world over would close with the parting hail, "I'll see you in Liverpool." After a few deep water voyages made in clipper time, on July 9, 1878, coal laden from the Sound to San Francisco, she struck on Duxbury reef and became a total loss.

When the lumberjacks who discovered Humboldt bay from the landward side wished to travel on its surface their method was simplicity itself. Hopping on a log when the tide suited, off they went, helping along with a pole when in shallow water, or indulging in a bit of "birling" by way of diversion. With the building of settlements this picturesque feature of navigation, although still useful on occasion, became too slow so that almost from the start shipbuilding became a leading industry.

A Captain Allen was the pioneer boatman of Humboldt bay, according to the records, he having begun with a small sloop. Thinking that he could do better with steam, Allen had the Fays build for him at their yard at Bucksport, the "Glide," a steamer about sixty feet in length and costing $7000. The vessel proving unprofitable, in 1858 the machinery was removed and placed in a new hull. The new boat was named the "Pert" and in 1860 was sent to San Francisco, Captain Allen returning to his sails. The first sea-going vessel from this section, the "Phoebe Fay," a schooner of 100 tons for the lumber trade, was also built at Fay's yard in 1854.

The demand for lumber at San Francisco gave an impetus to ship building all along the coast and Humboldt bay soon came in for its share, schooners following each other from the ways in rapid succession. In 1865, E. and H. Cousins built the brig "Hesperian" of 241 tons followed by the barkentine "Western Belle" of 275 tons, the latter being lost with all hands on her maiden voyage.

(b) Bancroft's History of Oregon, Vol. 2, p. 255.

In common with the rest of the coast, ship building on Humboldt bay has suffered periods of depression, yet the builders have ever been able to "come back" on the slightest encouragement and the products of the Cousins, Bendixen and other builders have upheld the standard of excellence to which the wooden vessels of the Pacific Coast have attained.

That difficulties attendant upon pioneer ship building were not confined to the Northwest is shown by the experience of early California builders. Leaving out San Francisco bay for the present, let us consider the pioneer vessels of the southern coast. It is not alone a question of latitude which keeps the two or three vessels, scattered over as many centuries by the Spanish builders since they first crossed the Isthmus, from taking precedence in these articles, but from the fact that with all their opportunities and needs, from Panama to Nootka, the Spaniards never had a permanent shipyard. At the naval base and arsenal at San Blas the only record of building is that of a flotilla of large canoes with which to repel the attacks of hostile Indians. This "mosquito fleet" was as short lived as the insect from which it takes its name and does not appear to have inflicted a commensurate amount of damage. Nevertheless, among their few ventures in ship building, there is one instance which, from the unusual energy and enterprise of the originator, merits as full a measure of notice as it is possible to give.

At the beginning of the eighteenth century, the Missions of Baja California were at a standstill for the want of transportation facilities. Along the shores of the gulf were a number of wrecks, some of which the padres tried to patch up or to make new vessels from the old material. In this they were unsuccessful, the reconstructed vessels speedily meeting with disaster. In 1718 Father Juan Ugarte set about the building of a substantial vessel. From the natives he had learned that there was good timber in the mountains about thirty leagues inland from Santa Rosalia and securing the services of a shipwright the priest set out with a party to investigate. The difficulties to be overcome were so great that the builder would have nothing to do with the project and Ugarte, meeting with opposition from his colleagues, returned to the coast. But to Ugarte the need was the only consideration, so getting rid of his assistant, with a party of soldiers and friendly Indians and proper, or at least available, tools he again set out for the hills. Roads and bridges were made, the timbers cut and hewed and hauled by ox teams to the beach. After four months of arduous toil, in which he had borne his full share, Ugarte had his material landed at Loveto and proceeded with the work of building. When the hull was completed it was blessed and christened "El Triunfo de la Cruz," and with a cross nailed on the end of the bowsprit was launched on September 14, 1719. (c)

In November 1720, the vessel being fully completed and no navigator being at hand, Ugarte undertook that task as well and successfully sailed the "El Triunfo" from Loveto to La Paz. I am unable to learn the tonnage or rig of the vessel, but she must have been of fair size as reckoned in those days, for it was intended that she should make a voyage to Manila. For some reason this voyage was not undertaken and she was kept on the coast assisting in the founding of new missions. The last mention I find of her is in 1735, by which time her builder had passed to the land where there is no more sea.

The first commercial vessel built in Southern California, so far as the records show, was the "Santa Barbara," a schooner of thirty-three tons built at Santa Barbara in 1830 by Michael White and Henry Paine as a trader and sea otter hunter for a Captain Guerra. In this instance the builders found material close at hand in the wreck of the ship "Danube," from which the schooner was built.

Although ships from Mexico called more or less regularly, the Missions were badly in need of handy vessels of their own and in 1830 Father Jose Sanchez, of the Mission San Gabriel, decided that one should be built. As he had been involved in a smuggling scandal with an American trader a couple of years before, that may have had some effect upon his decision. The Missions St. Francis and Santa Clara having each a small schooner built for them at Fort Ross, the worthy padre may just have wished to be on a footing of equality with his neighbors, somewhat after the fashion of the Highland clansman of whom I have heard. As the anecdote goes pretty well back to the genesis of ship building the digression may perhaps be permissible. A group of Highlanders were boasting of their lineage when one of the Clan Urquhart asserted that his ancestor was born in the ark. This staggered the others for a moment, until one, quickly recovering his poise, retorted "And is that all the far back you can go? That will be nothing whatever, for I can tell you that the McLean had his own boat at the time of the Flood."

At any rate arrangements were made with an American named Chapman to build a schooner at the expense of the Mission. Chapman had learned the trade of shipwright at Boston, but scarcely under such conditions as were to be found on the Pacific. There being no timber near the coast, Chapman with a party of Mission Indians went about thirty miles back into the hills, following the precedent established by Father Uquarte over a century before. Suitable timber having been located, it was cut, hewn and transported to the Mission, where the timbers were framed. When the work of framing was finished the material was hauled to the beach at San Pedro where the vessel, a schooner of about sixty tons, was built. The "Guadalupe," so the vessel was named, was launched in the latter part of 1830 with all the ceremonies attendant on the dedication of a ship to the services of the church.

(c) Hittell's History of California, Vol. 1, pp. 119-222.

Why Choke the Oil Supply?

When Lloyd-George said that the salvation of Great Britain lay in three words, "ships, ships and SHIPS," he might well have added that without which ships are useless—fuel. Just as ships are an absolute necessity to the transportation facilities which have enabled the Allies to conduct a great and wasting war and at the same time build up their potential strength so that they have grown stronger instead of weaker as the war progressed, in an equal measure must our ships depend upon their fuel supply.

Here on the Pacific Coast we have come to look upon crude oil as the basis of maritime fuel supply. The great majority of our ships burn oil, and it is obvious that should the necessity for a return to coal arise, that the installing of bunker space would prove costly from a monetary point of view and doubly expensive in the matter of time.

The continuation of our oil supply in sufficient quantities and at a reasonable cost is a matter of paramount importance at this time in order that the ships of the Pacific Coast may work at their highest efficiency and do their best in the great struggle upon which we have entered; for this struggle, more than any war recorded in history, is a war of ships.

The oil fuel situation on the Pacific Coast is rapidly approaching a critical condition. Visible stocks are rapidly being deplenished. The Government is still hankering after its pound of flesh from the oilfields, and in consequence the new drilling and exploration work which might reasonably have ben expected to take care of the increased demand by "bringing in" new wells is practically non-existent.

It would be well for Government officials at Washington to consider that it is not the ships alone that are threatened by the impending oil famine. Our Western railroads for a great percentage of their mileage are dependent upon oil fuel, and the shortage is just as threatening here as with the ships.

Laying aside the much discussed technicality under which the Government has squashed development work in large areas of oil-bearing lands, and even ignoring the fact that, in the case of the Midway field at least, a reserve is being created which has the effect of curtailing output and yet reserves nothing, it must be patent to everyone that a governmental policy which interferes with the free and unrestricted moving of crops from large and productive areas of our country is essentially wrong from a military standpoint if for no other reason.

The letting down of the governmental bars in southern California could in no way affect the formation of real naval fuel-oil reserves. The reserves which have been set aside in the undeveloped oil lands of the country will amply take care of the navy for years to come, and these reserves are so located that adjoining fields cannot drain the supply. It would, indeed, be a sad commentary on the wisdom and ability of our Government if it allowed a dogged determination to stick by an empty legal technicality to interfere with the war efficiency of the transportation units of a large section of our country.

ELECTRIC DRIVE FOR BATTLESHIPS COLORADO AND WASHINGTON

Contracts totaling approximately $2,000,000 have been placed recently with the Westinghouse Electric and Manufacturing Company of East Pittsburgh, Pa., by the New York Shipbuilding Company, for furnishing the necessary electrical equipments for the propulsion of the new superdreadnaughts Colorado and Washington.

The equipments to be furnished are practically duplicates of that contracted for by the Navy Department for the U. S. S. Tennessee, now building at the New York Navy Yard. The four propellers, as in the case of the Tenessee, instead of being mechanically connected to driving engines or turbines, are to be driven by individual motors. The current for the motors will be furnished by two turbine generators.

In addition to the main generating equipments and propelling motors, the contracts include auxiliaries for the main turbine generators and smaller auxiliary turbine generators for supplying light and power throughout the ships. Westinghouse electric motors will also be utilized for doing nearly all the work on board from raising the anchor to steering.

The "Jules Henry," originally a tank-ship (sailing vessel), which has been cut in half, lengthened, and fitted with Werkspoor Diesel engines.

Novel Method of Producing a Motorship

By T. Orchard Lisle

LAST year the old steamer "City of Sydney" was converted at San Francisco to a sailing ship without mechanical power, which, in these days of Diesel-driven motor ships and oil-engined auxiliaries, indeed seems strange. Evidently different shipowners have vastly contrasting ideas, because an entirely different procedure was carried out in the case of the old steel-built sailing tank ship "Jules Henry," which originally was constructed in 1900 for A. Vimont & Co. of Marseilles, France. Her owners considered that it would pay to lay her up, reconstruct her, and convert her to a full-powered Diesel-driven motor ship, and now she is in service giving that regular and profit-earning speed unobtainable from a pure sailing vessel, so she is proving to be an economical investment despite the high cost of conversion.

Not only did her owners have her changed, but she was cut in half at midship and lengthened 53 ft, so despite the very moderate space required by, and weight of, the machinery the cargo capacity has been increased from the old figure, 2,400 tons, to the new figure of 2,800 tons, arranged in seven tanks. Three kinds of oil cargo can be carried and the tanks are separated from each other by coffer dams. Having the clipper-bow, counter stern, two masts, and a pair of smoke stacks aft, she is a quaint looking craft, but none the less serviceable.

The work of lengthening and converting her was successfully carried out at the Wilton shipyard at Rotterdam, and her new length is 304 ft. by 40 ft. beam, and her loaded displacement now is 5,150 tons, compared with 3,805 tons previously; and of the weight gain, the machinery and fuel weigh 495 tons, but 90 tons were saved by the removal of two of the masts and their sails and rigging, also a reduction of 6 ins. in the freeboard was allowed by the authorities, so that the "Jules Henry" is "some ship" now. Her present deadweight capacity is 3,400 tons, but, of course, this without the foregoing figures gives no idea of her actual carrying capacity, because only 295 tons of this represents fuel, whereas a steamer would require in excess of 1,000 tons in her bunkers. This 295 tons of fuel is sufficient for 70 days, as her daily consumption only is about 4¼ tons with the ship loaded.

The machinery consists of two direct-reversible Werkspoor-Diesel engines of the single-acting four-cycle type, fitted with short pistons, crossheads and guides. Each develops 675 indicated-horse-power (500 shaft h.p.) at 180 r.p.m., this from six cylinders, 16½ in. bore by 23½ in. stroke. These motors are of the open steam engine class, the crank-pits being enclosed by means of detachable light steel plates, steel columns carrying the cylinders, with a cast-iron column at the back for supporting the crosshead guides, while diagonal columns take up the lateral stresses. Including auxiliaries, the machinery weighs 200 tons, which is quite moderate for a twin-screw installation of 1,350 total i.h.p., and compares very favorably with a steam plant.

These auxiliaries are steam, which is supplied by an oil-fired donkey boiler, but no data is available as to whether the exhaust gases from the main motors are utilized to fire this boiler during the daytime, as is usual with Diesel installations of this particular make. This drives the steering-gear, the windlass, a winch on the poop deck, and an auxiliary air-compressor in the engine-room. In addition to these steam is supplied to two Worthington pumps, 9½" by 8½" by 10", that have a capacity of 100 tons of oil per hour, and they are arranged in the pump-room on the 'tween deck. Each pump can empty three or six tanks, as desired, or pump any tank independently of the other pump. But for emptying No. 1 tank there is a special 6" by 7½" by 6" pump, and this is used for loading bulb benzine, and has 6" discharge connections. When the work of lengthening was being accomplished after the hull had been cut, two halves of the slip-way were parted by uncoupling the carriage at the center, and the fore-part was drawn up, whilst the after part remained in its place.

AN INTERESTING INSTALLATION

The Atlantic Fruit Company of New York secures bananas in Cuba and transports them to the United States by steamer. One of their ports in Cuba is Sama. To collect the bananas from the neighborhood of this port and carry them to the steamers at Sama, the company uses a barge, which is towed by a tug. In 1915 a gasoline engined tug was used for this purpose and the gasoline bill for the year was $2,000. Seeing great room for improvement in the matter of fuel consumption, the Atlantic Fruit Company purchased from the Fulton Manufacturing Company of Erie, Pennsylvania, a 70 h.p. 4-cylinder oil engine of the straight Diesel type. The fuel bill for 1916 with this engine was $130.

The boat in which this engine was installed was built at Sama of Cuban mahogany, even the engine bed being of this wood. Stem and knees are made from natural mahogany crooks and the craft is an exceedingly staunch one. The boat is 55 feet long by 12 feet beam. The pilot house is located at the forward end of the cabin and just aft of this is a large bedroom fitted up for the manager of the company. Aft of this stateroom is the galley, under the ceiling of which is a 75-gallon gravity reservoir for supplying the engine's fuel pumps. Aft of the galley is a large, roomy engine room.

This boat tows a sixty-ton barge on which sometimes as many as 7000 bunches of bananas are loaded. All the towing is in the open sea, sometimes almost out of sight of land. There is dangerous work in the shallow, small harbors that the craft must enter to pick up its cargo, the tide rips being very strong and the sea choppy. The longest regular run is 57 miles, and during the banana season approximately 400 miles are covered per week.

The engine is a 4-cycle, 70-h.p. Fulton oil engine of the straight Diesel type, operating on low grade, black Mexican oil. It is non-reversible, but equipped with a Paragon reverse gear. The compressor is mounted on the forward end of the crank case, driven directly off the main shaft. The flywheel is at the after end. The propeller is a three-bladed 44 by 26-inch wheel, turning 400 r.p.m.

When the tug tows its sixty-ton barge loaded it attains a speed of eight miles per hour, and when running alone it makes eleven miles per hour. It is interesting to note that the tug seems to make almost the same time when bucking against a heavy sea as when running in quiet weather.

In the matter of upkeep and repair costs, the engine has been remarkably successful. In addition to some parts which the builder has furnished, the total amount of bills for repairs to the Atlantic Fruit Company since the engine was sold in February, 1916, is $7.67.

LAUNCHED FOR THE ARGENTINE

The "Ingeniero Luis A. Huergo" is the latest of a number of vessels constructed at the yards of the Fore River Shipbuilding Corporation for the Argentine Republic. She is a bulk oil carrier, is 344 feet over all and will carry a dead weight of about 4600 tons.

In general appearance the "Ingeniero Luis A. Huergo" conforms to the typical bulk oil tanker design, having a poop, bridge and forecastle, two pole masts, one smoke stack, with machinery located in the stern. Accommodations have been arranged under the forecastle deck for a hospital, carpenter shop, lamp room, paint room and stores. Under the bridge deck are located the cabins for the navigating officers and wireless operator, together with a large dining salon.

In the pump room are powerful pumps for transferring the oil cargo either from ship to shore or shore to ship. Forward of the pump room are twelve oil tanks, six each side of an oil-tight center line bulkhead, these tanks having a stowage capacity for 1,370,000 gallons of oil. Separating the forward cargo oil tanks from the cargo hold is a cofferdam four inches wide so as to prevent any

Tug "Juba," of the Atlantic Fruit Company, equipped with a 70-hp. four-cylinder Fulton Diesel engine.

Launch of the tank steamer "Ingeniero Luis A. Huergo," built by the Fore River Shipbuilding Corporation of Quincy, Mass., to the order of the Argentine Republic.

damage to cargo by oil leaking through from the adjacent tanks.

The propelling machinery consist of a single, vertical inverted triple-expansion engine designed to drive a four-bladed propeller. Steam is furnished by two single-ended Scotch boilers arranged to burn fuel oil.

The vessel is in an advanced stage of completion, having her boilers and machinery installed and her smoke stack in place. The Fore River officials anticipate, therefore, that the vessel will be completed early in April, after which she will immediately take on board a full cargo and sail for Argentina.

"GULFMAID" LAUNCHED

The accompanying illustration shows the tanker "Gulfmaid" entering the water at the plant of the New York Shipbuilding Corporation, Camden, New Jersey. The "Gulfmaid" is the ninth tanker built at this yard to the order of the Gulf Refining Company and is 406 feet 6½ inches long over all, 51 feet 3 inches beam, 23 feet 6 inches load draft, 11½ knots speed and is driven by engines of 2650 horse power, steam being furnished by three Scotch marine boilers.

The "Gulfmaid" is the fifth of her class and is to be succeeded by one other of the same dimensions. The "Gulfmaid" class have a carrying capacity of 2,320,000 gallons of oil in 16 main and 6 wing tanks; the propelling machinery is aft and quarters are provided for officers and crew amidships and aft. The vessels are of more than average speed, being good for 11½ knots at sea; the over all dimensions are 405 feet 7 inches long, 51 feet 3 inches beam by 30 feet 2 inches moulded depth.

The boilers are arranged for conversion to coal from oil burning if necessary or desirable. The cargo pumping arrangements are such that several grades of oil can be handled at the same time.

In evidence of the general seaworthiness of these ships, it is interesting to note that the "Gulflight" survived a mine explosion early in the war.

THE QUESTION OF SIZE

The policy of building a large number of steel ships of low individual tonnage as opposed to a smaller number of bottoms of greater tonnage is one that is open to some very serious objections. In the case of wooden ships, of course, there is a governing limit as to size, as 5000 tons deadweight is about as far as the builders dare go without making their craft virtually a composite ship.

Considerable light is thown upon the problem in a resolution adopted by a group of Manchester (England) shipping experts which reads in part as follows:

"The policy of the small ship construction can only have a most disastrous effect on the nation, the man power required by the army, and our chances of victory. The Germans claim to be sinking 9,000,000 tons a year and hope to sink still more. Allowing losses by mines and natural causes to balance any exaggeration of German claims and

Launch of the "Gulfmaid" at the New York Shipbuilding Corporation's plant.

The "Gulf Maid," recently delivered by the New York Shipbuilding Corporation and the ninth vessel built at this plant for the Gulf Refining Company.

assuming that we build one-half the lost tonnage (about two and a half times our pre-war output and other countries the balance, about five times their pre-war output), we have increased last year's output by about 4,000,000 tons, equivalent to 1,600,000 tons of cargo capacity per year.

"Comparing ships of 2,000 tons and 16,000 tons displacement carrying 650 and 8,675 tons of cargo respectively and taking the North Atlantic passage as a basis, we should be required to build each year 2,460 of the smaller ships but only 185 of the larger.

"The smaller ships would cost £111,000,000 and the larger only £46,000,000. The small ships would use 1,550,000 tons of steel and 575,000 tons of timber, and would consume 6,750,000 tons of coal on the outward voyage per year.

"The larger ships would absorb 1,030,000 tons of steel and 382,000 tons of timber and consume only 1,560,000 tons of coal.

"The number of men employed in building the ships, including making and handling steel and other materials, would be 635,000 for the smaller ships and 285,000 for the larger. The coal consumed would account for 45,000 men for the small ships as against 10,500 for the larger. Thus the larger ships would release about 380,000 persons for other national service. Moreover, the larger ships would require 60,000 fewer mariners.

"Again, the percentage of loss both in number of ships and in cargo-carrying capacity will be greater with small ships than with large, and the former will produce greater congestion in ports.

"The policy of the small ships, therefore, is all wrong. All our shipbuilding energies should be directed towards building the largest ships our various yards can efficiently handle."

Of course, it may be argued that the labor problem in Great Britain is much more acute than in the United States, and that our "man power" is still intact and undisturbed, but is it not true that shipbuilding is but one of the countless industries that will be calling for more labor?

The timber used on steel ships for cabins, and in cargo holds would be no problem whatsoever in this country, although it well might be in Great Britain with a large number of very small craft building.

The ability to greatly increase the present American output of steel tonnage is largely dependent upon the supply of steel plates and shapes and the manufacture of propelling machinery. In view of this fact, it would seem to us that it would be wise to keep all the American yards that have been turning out large numbers of freighters between the 7500 and 9000-ton deadweight limits going full blast on a standardized hull with a deadweight capacity somewhere around these figures.

SLOAN SHIPYARDS CORPORATION

This concern is entering upon its shipbuilding career in a manner that proclaims both thoroughness and permanence. The plant occupies twelve acres of ground at the extreme head of Puget Sound. Work is progressing just as rapidly as labor and piling can be secured, the plans calling for a total of 7300 piles in the foundations for building slips and yard flooring. A very large area will be completely floored with three and four-inch planking.

As far as actual shipbuilding operations are concerned, the Sloan Shipyards Corporation has just started keel laying for their first six vessels. The six building berths are practically completed and the addition of either two or four more slips is contemplated, the scarcity of labor and material being the drawback to completing these extra slips immediately.

The idea of permanence is prevalent everywhere in this fine new Olympia shipyard. Large, modern machines for working the heavy timbers are everywhere in evidence and overhead handling is taken care of by gantry cranes between each pair of ships. The handling of material in and about the yard is taken care of by two stiff-leg derricks and a large locomotive crane, there being a complete system of car tracks in and about the shops and shipways. The yard maintains a Seattle office, which is located in the Colman building.

Like many of the other shipyards in the United States, both steel and wood, the Sloan Shipyards Corporation are building a standardized craft.

Diagonal Strapping in Large Wooden Ships

By John L. Bogert

"Conceive a series of planks well put together to represent the longitudinal fastening of a ship, and another series laid across them to represent the transverse framing, with every plank fastened to every cross-beam by a through-bolt or nail; and then conceive every joint of these planks to be filled with hard stuff, like oakum, hammered into it with an iron wedge and mallet until the joint is hammered quite hard and can hold no more, and the structure seems quite rigid—as rigid as we can conceive it, and for the moment it is as rigid as we do conceive it: but, unluckily, it will not stand so. Subject this structure to light strains, it will remain rigid; but subject it to such a strain as will slightly compress the longitudinal plank, and do this cornerwise alternately in opposite directions, and you will find that as you change the direction of the strain from one corner to the other askew, each plank will move a little way along the other, and return back again when the force is the other way. This goes on more and more as you repeat the operation, and this is exactly what does happen to the planks of a ship when she labours long and heavily over a head-sea, likewise it is what does happen to the frame when she labours heavily in a cross-sea. To those heavy strains everything is found to yield a little; planks give by each moving a little along the other, —bolts begin to widen their holes as the planks strain across them, first one way, then the other: the couples of the timbers begin to draw from their fastenings as the ship careens first on one side, then on the other. A friend of mine, who made a voyage across the Atlantic in heavy weather in a very large wooden ship of weak construction, used to watch carefully the edges of the planks opening and shutting as she went from the top to the hollow of a sea, and used to fill his tumbler by watching the opportunity when a joint near him opened, and a jet of water passed in. I saw her when she returned from the voyage, and I was satisfied that the seams must have opened wide, for I saw the oakum calking hanging in festoons. She went another voyage, and was never heard of again."

The foregoing was written by a famous naval architect, a vice-president of the Institute of Civil Engineers and also a vice-president of the Institute of Naval Architects, in the year 1865, when wooden ship building was a highly developed art —now unfortunately a lost art. Sir Robert Seppings is usually credited with being the first to point out the necessity of providing diagonal strength, and back in the '50s of last century the largest and best wooden ships were always built with "Seppings' Diagonals," either in the shape of diagonally disposed timbers, wrought-iron straps passing from wales to keel, or diagonal planking combined with the longitudinal planking.

As early as 1847, when the keel of the "Powhatan" was laid at the Norfolk Navy Yard, the U. S. Navy Department was specifying for such vessels (she was 251 ft. 6 in. long by 45 ft. beam by 26 ft. 6 in. deep) diagonal strapping, and every officer familiar with the history of our Navy knows what a long and useful life this particular wooden-hull vessel enjoyed.

In 1849 Messrs. Bishop & Simonson built the "Ohio" (248 ft. by 45½ ft. by 24½ ft.) for the Law Line, and Smith & Dimon built the "Georgia" (255 ft. by 49 ft. by 25½ ft.) for the same company. Both ships were diagonally braced with 3-in. round iron. The Collins Line steamers "Atlantic," "Pacific," "Arctic," and "Baltic" (282 ft. by 45 ft. by 24 ft. and 32 ft.) were built in 1850, the "Arctic" and "Atlantic" by William H. Brown and the "Pacific" and "Baltic" by Brown & Bell. All four ships were diagonally strapped both ways, each line of straps 4 ft. from centre to centre. More than twenty years after the date of their launching the "Atlantic" and "Baltic" were carried on the books of the American Bureau of Shipping as successful sailing ships.

The same is true of the famous paddle-steamship "Vanderbilt" (320 ft. by 48 ft. 8 in. by 29 ft. 8 in.), built in 1855. She was fitted with seven solid transverse bulkheads and was longitudinally and diagonally strapped. So late as 1879, as a sailing ship (called the "Three Brothers") she was considered a strong and seaworthy vessel.

The last wooden ship built for the Collins Line was the "Adriatic" (351 ft. by 50 ft. by 33 ft. 3 in.). She was diagonally strapped like the other Collins ships.

No account of well built large wooden steamers would be complete that failed to include the large ships built for the Pacific Mail Steamship Co., the "Great Republic," "Japan," "China," "Arizona," "Alaska," "Colorado," "Constitution," "Henry Chauncey" and a dozen others, many of them built by William H. Webb, and all of them thoroughly and properly diagonally strapped. Some of these ships were over 5000 tons Custom House measurement, more than 350 ft. long and 50 ft. beam with 32 ft. depth of hold. These larger wooden ships were double diagonally strapped and double planked from keel to top of wales.

In 1865 the Royal Dockyards of Great Britain were building 50-gun wooden frigates (307 ft. by 52 ft.) whose frames were diagonally strapped with iron straps 6 in. wide and 1¼ in. thick. Those were the days when wooden ship building was understood, and no first-class shipbuilder would have considered for one moment building large wooden vessels in which ample provision had not been made to meet twisting and wrenching strains. Many large wooden schooners have recently been built on the Pacific Coast and elsewhere in which no suitable provision has been made to meet twisting strains. These vessels must inevitably prove dangerous, expensive investments, liable to start their seams leaking in heavy weather. No form of keelson construction, no matter how massive, can remedy this defect—even a longitudinal bulkhead running the whole length of the vessel is no solution of the problem. Twisting strains such as a ship is subjected to when "wallowing" diagonally across seas is a skin strain and acts like all torsion strains, along diagonal lines in the outer skin or planking. It must accordingly be met by diagonal skin strength. Vessels built on the "bread and butter" principle as applied to their planking—two diagonal courses of planking under an outer fore-and-aft course of planking—are well calculated to meet these strains, and such vessels are certainly strong in this particular. Wooden vessels, built without diagonal straps, can be and have been cured by the application of an outer or inner course of diagonal planking. The British Royal Dockyards usually applied Sir Robert Seppings' diagonal trusses on the inside of the ship between the bilges and the shelf pieces of the lower hold.

Wooden ships can be built to stand any strain that ordinary sea service may impose, and that, too, when of much larger size than any yet constructed. The problem of the large wooden ship is a problem of fastenings. Transverse bulkheads are necessary because no keelson the full length of a ship is capable of supporting its own weight without sagging, let alone keep the bottom of a ship from "coming up" or "going down." A "hog-frame" similar to those used so successfully in sound and river steamboats, or a truss running fore and aft reaching from the top of the keel to the under side of an upper deck, running continuously for at least three-fifths of the ship's length, can without doubt prevent "hogging" or "sagging" if properly designed. A ship is a hollow girder and most wooden ships have suffered in the past from lack of longitudinal strength in their decks. A wooden ship 420 ft. long by 60 ft. beam by 42 ft. deep is a perfectly practical proposition: it is simply a question of locating the proper material in the proper way in the proper places.

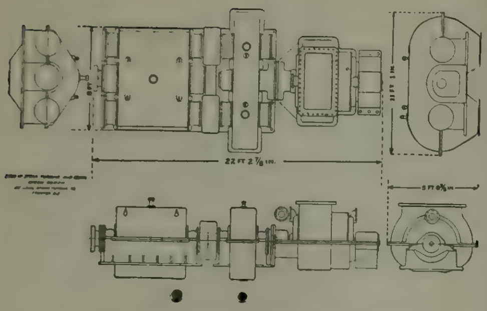
Standardized Geared Turbines for Cargo and Passenger Boats

THE saving in weight, fuel and expense for upkeep, including attendance, achieved by the use of geared steam turbines for ship propulsion is becoming generally recognized. Over 200 power units of this type are at present under contract or in construction in this country. We are informed by the De Laval Steam Turbine Co., of Trenton, N. J., to whom the accompanying photographs are due, that over 150,000 horsepower of geared marine turbines and gears for 500,000 hp. altogether are now going through its shops alone.

The weight of a greared marine turbine, including valves, coupling, etc., is only forty to fifty pounds per shaft horsepower, as against about twice that weight for a reciprocating engine. The saving in space will be apparent from the illustrations. Photograph 1138 shows a unit rated at 1500 horsepower. The turbine is designed to use steam at 180 to 200 pounds pressure, exhausting to twenty-eight-inch vacuum and consists of one velocity-stage wheel and seven pressure stages with separate reversing element. The reversing wheels are capable of developing 60 per cent of the forward torque. The normal turbine speed is 4000 revolutions per minute and the propeller speed ninety revolutions per minute.

The complete unit, as shown in the photograph, weighs only about 65,000 pounds, and occupies a space of twenty-one feet long by nine feet wide and eight feet eight inches high; that is, 164 cubic feet, or equivalent to about nine horsepower per cubic foot. The De Laval geared turbine unit shown in drawing 2396 is rated at 2500 horsepower, but is only about a foot and a half longer and two feet wider and one and a half feet less in height, so that it occupies altogether about 177 cubic feet, giving fourteen horsepower per cubic foot.

A saving of 10 to 20 per cent is made in fuel by the geared turbine over the reciprocating engine drive even in the largest vessels. As compared with the reciprocating engine, the geared turbine gives a better over-all plant efficiency, due principally to two factors. One of these is its ability to utilize higher superheat and vacuum than can reciprocating engines. The gain in turbine efficiency from superheat is about 1 per cent for each 10 degrees Fahrenheit, and from vacuum about 8 per cent between twentiy-eight and twenty-nine inches, referred to a thirty-inch barometer. The reciprocating engine, on the other hand, experiences difficulty with high superheats and benefits little from any increase of vacuum above twen-



A 2500-hp. De Laval steam turbine which is geared down to 90 revolutions.

ty-eight inches because of the limited size of the low-pressure cylinder and of the valve ports. In fact, too high a vacuum results in loss from the low temperature of the condensate.

The geared turbine set shown in drawing E2464 is designed to use steam at 265 pounds pressure and 130 degrees Farenheit superheat, exhausting to a minimum of twenty-eight-inch vacuum. The turbine is of the compound type, that is, arranged on two shafts. This type of turbine is supplied where the highest efficiency is desired. It also gives the advantage of duplicate turbines in case of accident. The gears are of the standard De Laval type, with rigid casings to hold the pinion and gear shafts in fixed and permanent alignment.

The turbines run at 2400 revolutions per minute and the speed of the gears and of the propellers is 110 revolutions per minute. The boats in which the units are to be installed are twin-screw vessels, they are 480 feet long, sixty feet moulded breadth and 12,500 tons dead weight and are designed for a speed of fourteen knots.

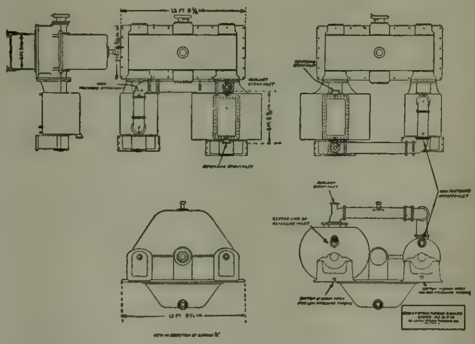
Further fuel economies are realized in turbined vessels by properly corelating the auxiliaries with the main unit. The steam consumption of auxiliaries sometimes exceeds 15 per cent of the total amount of steam produced by the boilers, even when running at full power, and in the majority of ships exceeds the amount of steam which can be used for feed heating. By diverting the surplus or excess auxiliary exhaust to an intermediate stage of the main turbine, this steam can be made to produce in the latter at least half as much power as it would have produced had it been received directly from the boiler.

Reduction gears for the battleship "Idaho," cut in the shops of the De Laval Steam Turbine Company No. 1154.

In reciprocating engine power plants, on the other hand, surplus auxiliary exhaust is frequently bled directly to the condenser in order to save the condensate, but with a total loss of the heat of the steam. Even where it is led to the intermediate receiver of a reciprocating engine, it cannot be used with much more than half the benefit gained by introducing it into an intermediate stage of a steam turbine.

The economy of the steam turbine is better maintained in service than is that of the reciprocating engine, as there are fewer parts to deteriorate and cause loss of efficiency.

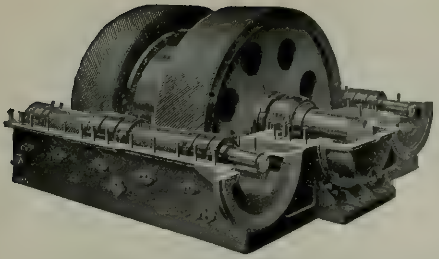
The turbine also shows a saving in operating expense, due to the fewer moving parts and the ease with which they are lubricated and adjusted. The oiling system is automatic and much simpler than the oiling system of a reciprocating engine.



Compound De Laval turbine geared from 2400 to 110 revolutions. This is a 2500-hp. unit.

There is no need of constant attention and frequent overhauling, such as the reboring of cylinders, refitting of valves and piston rings and adjustment of complicated valve gear. There are no packings, except the simple ones about the shaft. The consumption of oil is only trifling in comparison with that of a reciprocating plant; there is no expense to correspond to the cylinder oil required by the latter. This fact is also of significance as regards the operation of the boilers.

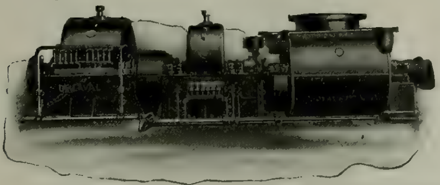
The fewer number of working parts and general greater simplicity of the geared turbine as compared with other prime movers, naturally leads to less expense for personnel in the engine room; that



Large De Laval reduction unit, gear and pinions, with upper bearing caps and casing removed.

is, fewer oilers, machinists and men for general attendance and repair work.

The present controversy over electric versus geared drive for battleships and battle-cruisers lends interest to the two gears shown in photograph No. 1154. These were cut in the shops of the De Laval Steam Turbine Co., and are to be used in the United States battleship Idaho, now under construction by the New York Shipbuilding Company.



No. 1138, a 1500-hp. 4000 to 90 revolutions reduction geared turbine.

A SPLENDID SERVICE RECORD

The Diesel-driven motorship "Sebastian" (7200 tons displacement) was placed in service at the end of last June, since when she has covered approximately 40,000 nautical miles at an average speed of almost 9 knots, without a single breakdown, cylinder crack, or piston crack, cylinder-head crack, crankshaft fracture, etc., although she has been worked harder than a steamer in the heaviest of Atlantic winter weathers.

The total number of engine stops at sea (accessory adjustments only) in nearly ten months amount to four hours with one engine and five hours with the other engine, also six hours with one engine when salt water got into the lubricating oil and had to be cleaned out. The mileage covered would have been about 3000 miles greater had she not been held up in England for fifteen days having certain alterations to her deck structure previous to her last recent voyage here.

Fuel consumption of the two main engines together has averaged under 6 tons (42 barrels) for 24 hours, with the engines averaging a fraction under 1000 i.hp. each at 115 r.p.m. This figures out at 0.27 lb. per i.hp.-hour, or just over 0.4 of a pound per shaft-horsepower. In her holds she carries 4100 tons of cargo.

On this last voyage to an American port both her Diesel engines ran for 16 days and nights without a single stop, voluntarily or otherwise, averaging 8.8 knots in most heavy seas and adverse winds.

In nearly 10 months the main bearings have worn down 1/128th part of an inch. The crankpin bearings, although opened out for examination at regular periods, have only been readjusted once in 10 months, the wear showing 0.2 mm. The crosshead bearings have been readjusted to 0.3 mm. in the same period. Compressor piston-rings are the same which came out with the ship, and show hardly any wear at all. A few of the main piston rings have been renewed, but this has been mostly due to breaking them when springing them off the pistons for cleaning purposes. The cooling-pump valves are as good as the day they were put in, some ten months ago.

Furthermore, the Diesel engines, which were built by Werkspoor of Amsterdam, were not run or tested in the shops. They were built, sent to England in packing cases, and installed in the "Sebastian," which was given a few hours' sea trial, and sent on her maiden voyage, arriving in New York in 16 days.

It is obvious that no shipowner would expect a steamship to put up such a fine performance, so it can be truthfully stated that the "Sebastian" has proved herself to be more reliable than steam. Her owners are Lane & Macandrew of London.

All the engineers of this ship state that their work at sea is far less arduous than that aboard a steamer, and that they have little to do other than watch the lubricating oil.

Diesel engines have enormous reserve emergency power, which can instantly be developed by increasing the pressure of the injection air, and the chief engineer of the "Sebastian" considers that if chased by a submarine he could obtain for a few hours as much as 1500 i.hp. per engine, although the builders' rating is 1100 i.hp. at 130 r.p.m.

Although passing through the war zone, the "Sebastian" is nearly immune from submarine attacks because of the absence of smoke from her funnel, so that three miles away she is not visible to the periscope of a submarine in average weather. Whereas the smoke of a steamer gives the U-boat about 20 miles radius.

The "Sebastian" was destroyed by fire at sea since the above was written. Fire had broken out in one of her holds and she was being towed by a U. S. Government vessel in an effort to reach a New England port when she sank.

With the Shipbuilders

AT one o'clock on the morning of May 9, the "La Merced" was launched from the ways of the Robertson yard at Benicia. This vessel with her sister ship were ordered by Andrew Mahony of San Francisco, but later both vessels were sold to the Standard Oil Company. The "La Merced" is 214 feet long by 42 feet beam and 19 feet depth of hold. She will be fitted with twin 160-b.hp. Bolinder engines as auxiliary power.

One of the latest launchings at the New York Shipbuilding Corporation's plant was that of the tank steamer "Edward L. Doheny Jr." on April 26. This steamer is built to the order of the Pan-American Petroleum Transport Company. She has a deadweight capacity of 12,350 tons and will carry over 4,000,000 gallons in bulk. She is 485 feet long over all, 468 feet 6 inches between perpendiculars, 62 feet 3 inches beam and 39 feet 6 inches moulded depth. The speed will be 11 knots and the vessel is built to Lloyds' highest rating.

Sanderson & Porter, of New York, will locate two wooden shipbuilding yards on the Pacific Coast, one on Grays Harbor and the other on Willipa Harbor. The reason for having two yards instead of one large establishment is the desire to secure connections with two mills and at the same time lessen the fire risk. Sanderson & Porter intend to handle a part of the Government's wooden shipbuilding program.

The Seaborn Shipbuilding Company of Tacoma launched a large steam schooner on May 19 for Captain H. C. Hansen of Norway. The schooner is 237 feet over all and will be fitted with compound engines, steam being supplied by Almy water-tube boilers.

The Sloan Shipyards Corporation of Olympia, Washington, is spending $40,000 in enlarging and re-equipping the Pioneer Iron Works recently purchased as an engine-building adjunct to the Sloan shipyard.

On May 7 the McEachern Ship Company, of Astoria, Oregon, launched the auxiliary five-masted schooner "Astria" for Norwegian interests. The "Astria" is 266 feet long, 42 feet beam, and 22 feet in depth, and is to be equipped with twin 320-b.hp. Bolinder engines.

On May 19 the Moore & Scott Iron Works of Oakland launched a large tanker building to the order of the Pan-American Petroleum & Trading Co. The craft is 425 feet long, 57 feet beam, and 33 feet moulded depth. She will be powered with General Electric Curtis geared turbines of 2600 horsepower, and steam will be supplied by three B. & W. boilers.

The purchasers of the Robertson yard at Benicia, California, have incorporated under the name of the Benicia Shipbuilding Company. The capital stock is $500,000, and the directors are Messrs. H. R. White, Roland C. Foerster, R. L. McWilliams, Howard Finn and Herman H. Phleger.

On May 17 the first steel steamer built in British Columbia took the water at the Wallace Shipyard No. 2. The vessel, which was christened "War Dog," is 300 feet between perpendiculars, 45 feet moulded beam, and 27 feet moulded depth. She is a single-screw steamer with reciprocating engines.

The Los Angeles Shipbuilding & Drydock Co. has been incorporated for $1,500,000, and the Directors named are A. Crutcher, S. M. Haskins, J. A. Gibson, Jr., M. Forrest, and E. E. Bacon.

The Atkins, Kroll Company has ordered a three-masted auxiliary trading schooner, 176 feet long by 38 feet beam and 14 feet depth, from W. F. Stone of Oakland, California. The vessel will be equipped with twin 110-horsepower Union gas engines as auxiliary power.

A tract of land at Numsen's Point, Maryland, near the Sparrow's Point shipyard recently purchased by the Bethlehem Steel Co., will be the scene of another large shipbuilding plant in the near future.

The Maryland Shipbuilding Co. has been formed and has secured a site on the Patapsco river, Maryland, with the purpose of building wooden ships.

The Ward & Burkheimer Shipbuilding Co. has been established at Olympia, Wash., to build wooden vessels. The proprietors are F. R. Ward and D. Burkheimer of Seattle.

The Phoenix Shipbuilding Co., with $2,000,000 capital, has been organized at New Orleans.

The Westminster Marine Railway Co., of New Westminster, British Columbia, has secured a lease of Poplar island, in the Fraser river, from the Dominion government, with the stipulation that the property be used for shipbuilding and ship repair work.

It is rumored that a $10,000,000 iron and steel plant, with mills for turning out ship plates and shapes, may soon be under way near Vancouver, B. C.

Capt. H. Nelson and a party of nine licensed officers arrived recently to take the Cunard liner "War Baron" when she is completed early in June. Her engines and equipment are all at the Willamette Iron & Steel Works, and B. C. Ball, president of the concern, states she will be ready for her trial trip early in June.

J. F. Duthie, one of Seattle's best known steel ship builders and President of J. F. Duthie and Company.

A boatbuilding plant has been established at Kelso, Washington, by Louis Paquet of Portland. Paquet has had a long experience in wooden construction and already has a large river boat under way at his new location.

The Somarstrom Brothers, of Oakland, California, are establishing a wooden shipbuilding plant at Columbia City, a short distance below St. Helens on the Willamette ricer. The property has a river frontage of 600 feet and a depth of 1000 feet with ample launching depths in the river.

The first of the vessels building for M. T. Snyder of New Orleans at the Columbia Engineering Works plant at Linnton, Oregon, was launched on May 17 and christened the "Juana Costa." The vessel is an ore carrier, 171 feet long by 36 feet beam by 14 feet depth of hold. She will be equipped with Diesel-type engines of 400 horsepower.

The Alaska Pacific Navigation Co. announces the construction of a full-powered motorship, 270 feet in length, at its Seattle plant.

The St. Helens Shipbuilding Co. is to build another auxiliary motorship for the Chas. R. McCor-

The Peninsula Shipbuilding Company, Portland, Oregon, where two 290-footers are starting.

mick Company. The vessel will be similar to the "Allard" with the exception that the engines will be amidship instead of aft.

Two 290-foot steamers are to be laid down by the Peninsula Shipbuilding Co. of Portland, Oregon. The launching of another vessel from this plant during the past month has released two building-ways which will be occupied by the two large vessels now to be started.

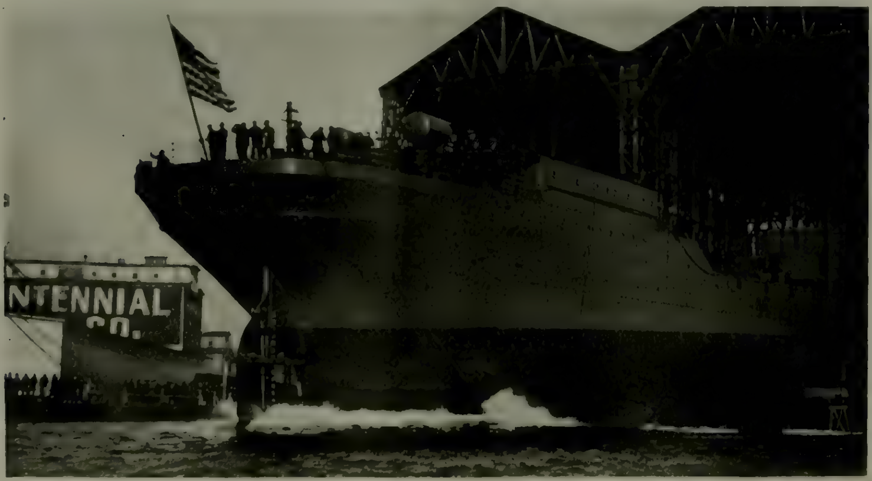
Hongkong shipyards are extremely busy these days turning out large steamers. The Taikoo Dockyard & Engineering Co. recently launched the 8000-ton steamer "Autolycus" for Alfred Holt & Co., and is also building two 420-foot steamers for the China Navigation Co. The same concern has three 10,000-ton deadweight steamers for the Canadian Pacific Steamships, Ltd., and three smaller steamers for the Straits Steamship Co. Another Hongkong yard, the Hongkong & Whampoo Dock Co., is building two steamers for the Indo-China Steam Navigation Co., four for Norwegian interests, and two for Siamese owners.

The steamer "Vesterlide" was launched at the shipyard of the Northwest Steel Company in Portland on March 31. The "Vesterlide" is 425 feet over all, by 54 feet beam by 29 feet 9 inches moulded depth, will have geared turbine drive and three Scotch boilers fitted to burn either coal or oil.

The auxiliary schooner "W. F. Burrows," built to the order of Libby, McNeil and Libby, was launched at the Standifer-Clarkson shipyard at North Portland on April 11. The vessel is 220 feet long by 43 feet beam by 21 feet depth of hold and is driven by a pair of 240 B. H. P. Skandia engines. She is also fitted with two 50 B. H. P. and one 10 B. H. P. Skandia engines for auxiliary machinery drive.

The "Southerner," a freighter 410 by 56 by 33 feet 6 inches molded, was launched at the Union Iron Works on April 10. She has a 2600 horsepower geared turbine drive and steam is furnished by three Scotch boilers.

The W. F. Stone shipyard at Oakland has contracted to build a 176-foot three-masted topmast schooner with twin 110 horsepower distillate engines as auxiliary power for Atkins and Kroll.



Launch of the "Josiah Macy" at the Skinner and Eddy plant, Seattle, on April 21.

The tanker "New York," recently completed for the Texas Company. The "New York" is one of the rapidly growing fleet of new steamers fitted with Brunswick refrigerating machines.

The National Shipbuilding Company of Seattle has ordered four 350-hp. Skandia engines from the Skandia-Pacific Oil Engine Company. Two of the engines are for seven and two for eight months' delivery.

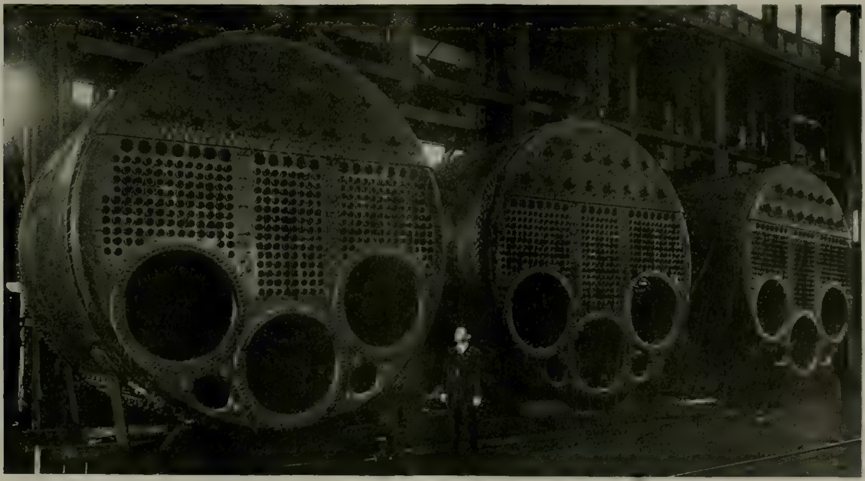
Four large ships which were recently purchased by the Anglo-Saxon Petroleum Company are to have their engines removed and replaced by Werkspoor-Diesel four-cycle crude-oil engines.

The Wallace Shipyards, Ltd., of North Vancouver, B. C., launched the auxiliary motorship "Jessie Norcross" on April 25. The ship is 236 feet long, 45 feet beam and 20 feet 10 inches moulded depth. She will be fitted with twin 160-b.hp. Bolinder engines as auxiliary power.

One of the latest motorships to arrive in San Francisco Bay was the "Santa Elena" from the yards of the Grays Harbor Shipbuilding Company. The "Santa Elena" is now having her two 320-b.hp. Bolinder engines installed. The vessel is a double-ender and of the shelter-deck type.

The Terminal Shipbuilding Company has been granted permission by the California Corporation Commissioner to sell 100,000 shares at par ($1) to acquire a piece of waterfront property on the Vallejo channel, San Francisco bay, and install a double set of ways. Subscriptions are to be taken on the guarantee of not less than 50,000 shares being sold and a deed to the shipyard site being turned over to the company prior to November 1, 1917.

The Standard Oil Company, having its principal North China office at Shanghai, with Mr. C. H. Blake as Manager, is owner of the "Mei Tan," built to the company's specifications under the direction of Captain W. Eisler, Marine Superintendent. The builders were the well known Chinese company, Kiang-nan Dock & Engineering Company of Shanghai. The "Mei Tan" is a very notable craft and is the first of several the Standard Oil Company is building for use through the Yangtse rapids to carry oils into the western provinces of China. She is the first ship built in a foreign country to receive full American registry under recent legislation and rules at Washington. The "Mei Tan" is 140 feet 6 inches long over all, 17 feet 6 inches beam, and 5 feet 6 inches normal load draft. She is twin screw with triple-expansion reciprocating engines with 1450 horsepower and a speed of 14 knots. Steam is supplied by two White-Forster water-tube boilers.



A row of big Scotch boilers at the Willamette Iron and Steel Works plant, Portland, Oregon. This concern has over sixty large boilers on order.

Launch of the "Santa Elena," built for W. R. Grace and Company by the Matthews Shipbuilding Company of Hoquiam, Washington.

The Skinner and Eddy Corporation has purchased the fifteen-acre tract upon which the firm has held options and eleven acres of which are now in use for shipbuilding purposes. This move necessitates the removal to a new site of the Seattle plant of the Hoflus Steel and Equipment Company.

One of the most interesting developments made public during the month just past was the purchase of ninety-five acres of water front land by the Union Iron Works Company from the Oakland Waterfront Company. The plans of development for this property include a canal half a mile long and 300 feet wide with 30 feet of water. This property, in connection with the six acres leased for twenty-five years from the city of Alameda, gives the Union Iron Works 3300 feet water frontage and 2400 feet of frontage along the Southern Pacific Railroad's right of way. The initial developments contemplate an expenditure of $5,000,000.

The Rolph Shipbuilding Company is the name now designating the old Bendixen shipyard on Humboldt Bay. The new concern was incorporated for $500,000 by James Rolph Jr., John D. Stelling and D. F. Swart.

Kruse and Banks launched the steam schooner "Johanna Smith" from their Coos Bay yard on April 7. The "Johanna" is building to the order of the C. A. Smith Lumber Company and is of the special type of carrier favored by that concern. She will be loaded and discharged by electric cranes and is fitted for carrying package lumber. This type of lumber carrier has resulted from the investigations carried on by Edward S. Hough, a well-known San Francisco naval architect. The "Johanna Smith" is 270 feet long over all and 43 feet beam.

NEW CONCRETE SHIP WAYS AT FORE RIVER

Following close upon the heels of the announcement that the Fore River Shipbuilding Corporation had been awarded the contract to build one of the great battle cruisers, comes the decision to construct an entirely new set of ways to handle this great war vessel. Over $500,000.00 will be spent for the work.

To facilitate the erection of the ways the Massachusetts State officials condemned the necessary land and the contractors, Aberthaw Construction Company, Boston, have begun the surveying and soundings.

The new ways will be as large or larger than any in the world, 990 feet long and will be fitted with electric cranes and overhead steel work embodying the most modern ideas for building vessels of all types. Even when one of the battle cruisers, which are the largest in the world, is lying on this set of ways, there will be 125 feet to spare in length, which may be taken to mean that the yard is preparing for a future growth in warships.

The heavy foundations, supporting crib for keel, blocks and launching ways, are all to be of concrete. Over 12,000 cubic yards of concrete and 3,000 wooden piles will be required and approximately 3,000 tons of structural steel will be used in erecting the crane ways. These will be 870 feet long and will carry one 50-ton and three 7½-ton cranes, all of 120 feet span. The larger crane will run 121 feet above mean low water.

There has been little delay in getting to work and while the ways are being built the shop work on the cruiser will go ahead rapidly. The Aberthaw Company plans to complete the ways, ready for laying of the keel, by the first of September.

Joseph Supple & Ballin are making fine progress with the two wooden full motorships for Gaston, Williams & Wigmore, of New York, and are holding two additional ways open for government work.

The Acme Engine

THE Acme Engine Company, in which Messrs. Con. Kreimler and Richard Froeboese are the leading spirits, are making rapid strides in the design and preliminary pattern and jig work on their new gas-engine. The design is the culmination of many years' experience in the marine gas-engine field, and the plans herewith and description of the engine will certainly be of interest to all readers interested in marine propulsion.

The Acme engine is of the "overhead" valve construction, this design being selected on account of fuel economy. The igniter is also placed in the cylinder head directly above the piston, thus bringing the distance from the point of ignition to the various points in the combustion chamber much closer than in either the "T" or the "L"-head type of engine, thus avoiding loss of power due to side pockets in the combustion space.

The bed plate is cast in one piece, including the extension for reverse-gear clutch bearing and thrust. The crank pits are separate, with oil-tight cellars under each bearing, which are of the ring-oiling type. The crankshaft journal bearings are of plastic bronze, easily removed and interchangeable. The frame is tightly enclosed to prevent the escape of burnt gases and oil. The frame is cast in one piece, planed to fit the bed plate, and bored to jigs to properly hold the cylinders in alignment. The sides of the frame are fitted with large oil-tight doors on both sides to give easy access to the crankshaft bearings, etc. This frame carries the camshaft on the inlet side of the engine, which is bedded on bearings on both sides of the frame and between each cylinder, and is easily removed without disturbing any other mechanism. The doors on the exhaust side of the frame are made large enough to permit the removal of the pistons and connecting-rods through the crank frame without interfering with the camshaft or other working parts.

The crankshafts are forged from solid steel billets and the bearing surfaces are exceptionally large. The connecting-rods, also forged steel, are provided at the upper end with hard phosphor-bronze wrist-pin boxes. The boxes are in halves and fitted with thin shims for taking up wear.

The camshaft is driven by spur gears housed in the frame at after-end. The rims of the gears are of solid steel forgings accurately machined, shrunk on to the cast-iron center and the teeth into the solid steel. The cams are made of machine steel, milled and hardened. The exhaust cams are interchangeable, as also are the inlet cams. Both are fastened to the camshaft with the gibhead keys. The valve lifters are provided with large interchangeable rollers which are made of machine steel and hardened.

On all six-cylinder engines the camshaft is made in two pieces and driven by spur gears housed in the frame at the forward and after end, which is also arranged in order to avoid excessive strain on the gears or shafts. The cams, camshaft, valve lifters and camshaft operating gears are run constantly in a bath of oil.

The cylinders are cast of close-grained gray iron and water jacketed throughout. They are accurately centered in frame, bored and reamed. The cylinders are cast separately, also the heads, which are held in place by studs. The circulating water is passed through outside by-passes from cylinders to heads.

The inlet and exhaust valves are mechanically operated and interchangeable. The valves are large in area with extra large seats. The valve guides are a separate casting and easily removable.

The engines will be equipped with slow-down mechanism, permitting the operator to operate at very slow speed—a valuable feature in fishing-boat engines. Compression release is effected by a single lever for all cylinders, permitting of easy starting.

The exhaust manifold is a separate casting held in place by studs in the cylinders and so arranged that it will not be necessary to disturb the exhaust line or piping to remove the cylinder heads.

The cylinder heads are cast separate and have a projection into the cylinder, under which a copper gasket is inserted, rendering blowing out under pressure impossible.

The pistons are made from close-grained gray iron, and have splash oil-rings. They can be removed from above or below, whichever preferred; below, by removing proper frame doors, and above by removing the heads only. The piston rings are of the regular snap-ring type, made eccentric so as to give an even pressure on the cylinder walls, thus insuring even wear throughout. The piston wrist-pins are made of machine steel.

All Acme engines are equipped with Schebler carburetors, which are of of the float-feed type. The suction end of these carburetors are connected by pipe leading to hot-air sleeve on the exhaust pipe, for vaporization of the fuel.

The engine is fitted with a substantial, sensitive governor, which controls the fuel as well as the air valve, thereby getting a perfect gas mixture at all times. The governor is driven by spur gears direct from the cam gear, without belts or friction, and is fitted with speed attachment whereby the speed of the engine may be changed as desired at any time while the engine is in motion.

The ignitors are of the "make and break" type, very durable and simple. The ignitors on all engines are one size only, therefore the one ignitor will fit any engine. They are easily detached from the cylinder-head by loosening two nuts. The time of ignition can be advanced or retarded at will, and thereby the speed changed while the engine is running. The ignitors can be removed without disturbing any other part of the engine.

The water-circulating pumps are either of the plunger or centrifugal pump type. Plunger pumps are attached to all the marine engines. They are equipped with special large check valves and are driven at half speed by the camshaft. An additional centrifugal pump is used on all 50-hp. and larger size marine engines. On all engines where centrifugal pumps are used for water circulation, the plunger pump which is attached to each engine can be used as a bilge pump or auxiliary engine pump.

The reverse gears are of the spur-gear type. The gears are made of forged steel, accurately machined and cut; the pinions are all bushed with bronze bushings; and the gears and pinions are housed in an oil-tight drum which is filled with lubricating compound. The shaft carrying this reverse gear is, on all one, two and three-cylinder engines, part of the crankshaft. On all four and six-cylinder engines it is a separate shaft, forged from hammered steel, with forged coupling, and by being bolted to the crankshaft can be easily disconnected, which permits an easy removal of the reverse gear from the engine. The reverse-gear friction is of the multiple-disc type, easy of adjustment, and liberal in dimensions. Inspection of the multiple-disc clutch is easily accomplished by removing the nuts which hold the reverse-gear extension piece, which in fact is only a cover over the friction plates.

The thrust bearing is securely bolted to the engine base. This bearing is very long and lined with babbitt. The thrust is taken up by thrust collars turned on the solid-center gear extension.

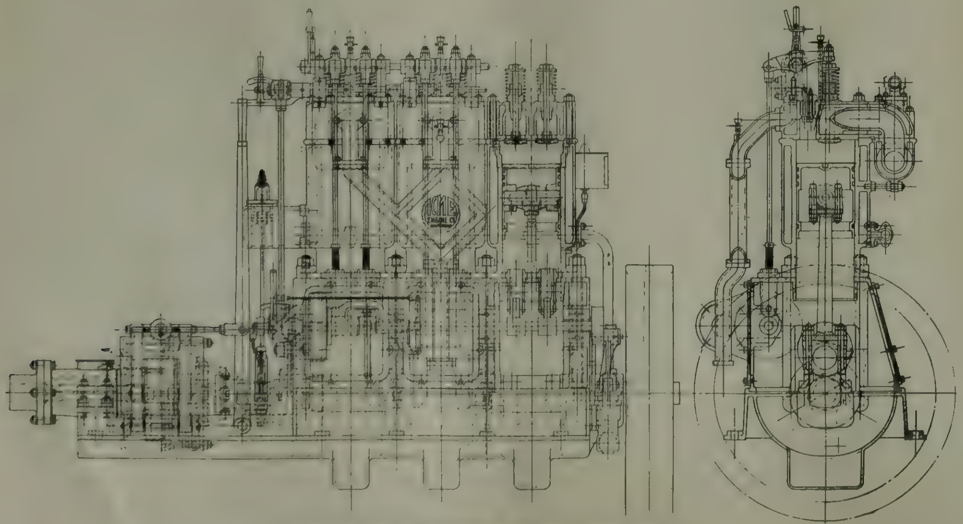
The engines are equipped with an air pump for whistle outfit. The pump is operated by an eccentric on the crankshaft between the after main bearing and reverse clutch.

The cylinder, pistons, piston brasses, forward main bearing, thrust bearing and other parts are lubricated by means of a mechanical force-feed oiler. This oiler is positively driven instead of belt driven.

The main journal bearings, which are fitted with plastic bronze boxes, have large oil cellars directly under them and are fitted with ring oilers. The base of the engine is arranged as an oil receptacle, and the well known splash system of lubrication is used for all the lower bearings, cams, etc.

As all parts of Acme engines are to be made to jigs and gauges, wherever possible, there will be no difficulty to furnish parts that will be interchangeable. It is the intention to have jigs for all parts of the engine that it is possible to jig, so that the customer ordering a repair part will have no trouble in placing it on his engine upon arrival. Owing to the fact that there will be but four bores and strokes of engines, and seventeen different power units made from these four bores and strokes, it is possible to highly standardize the construction.

The Western Pacific Railroad, it is understood, is to order a large car barge 320 feet long, the big craft to be engined with the machinery out of the old "Telephone."



Longitudinal and end elevation of the new "Acme" engine.

Material Handling Equipment

150-ton pontoon crane at Boston Navy Yard. Similar cranes at Honolulu and Bremerton.

IN the construction of unusual mechanical equipment such as heavy cranes and hoists operating under special conditions, no firm in the United States, or perhaps in the world, holds a more enviable record than that enjoyed by the Wellman - Seaver - Morgan Company of Cleveland, Ohio.

The standing and achievements of this concern are well exemplified in their record in pontoon cranes. The Wellman-Seaver-Morgan Company has built 150-ton pontoon cranes for the U. S. Navy Department stations at Boston, Bremerton and Honolulu, a 150-ton unit is under way for the Norfolk Navy Yard, and a great 250-ton pontoon crane will shortly be commenced for the Mare Island Navy Yard on San Francisco bay. The method of controlling the counterweight or counter ballast in the pontoon of these cranes, and also the method of using the counterweight for securing very slight lifts where desired, are unique in these structures.

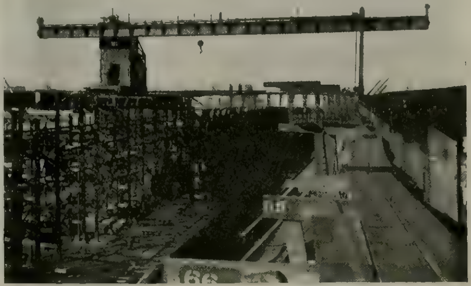
Owing to the fact that Wellman-Seaver-Morgan cranes as well as structural steel work of a widely varied character have found their way into every corner of the world, the engineers of this firm have become peculiarly rich in the experience which enables a firm to take up and settle individual problems. This fact is especially true of the material-handling outfit for shipyards, and it is not at all surprising that this Cleveland concern should meet the extraordinary demand for steel ships that has been sweeping over the country with a special crane, the features of which make possible the speeding up of work in every manner in which it is possible for a crane to perform this function.

The latest shipyard crane of this concern, which has been named the "1917 Merchant Marine Shipyard Crane," is of the hammerhead type, and, strangely enough, derives its efficiency by lending modern speed to a principle which is by no means new in shipyard practice. In many of the old established, but still successful, steel shipbuilding yards of England and Scotland the old wooden shipyard practice has survived of flanking the slips with a number of derricks, which permits of the handling of material at several points simultaneously without mutual interference. The derricks were crude when compared to a modern crane, but the seed of modern efficiency is plainly discernible in the system.

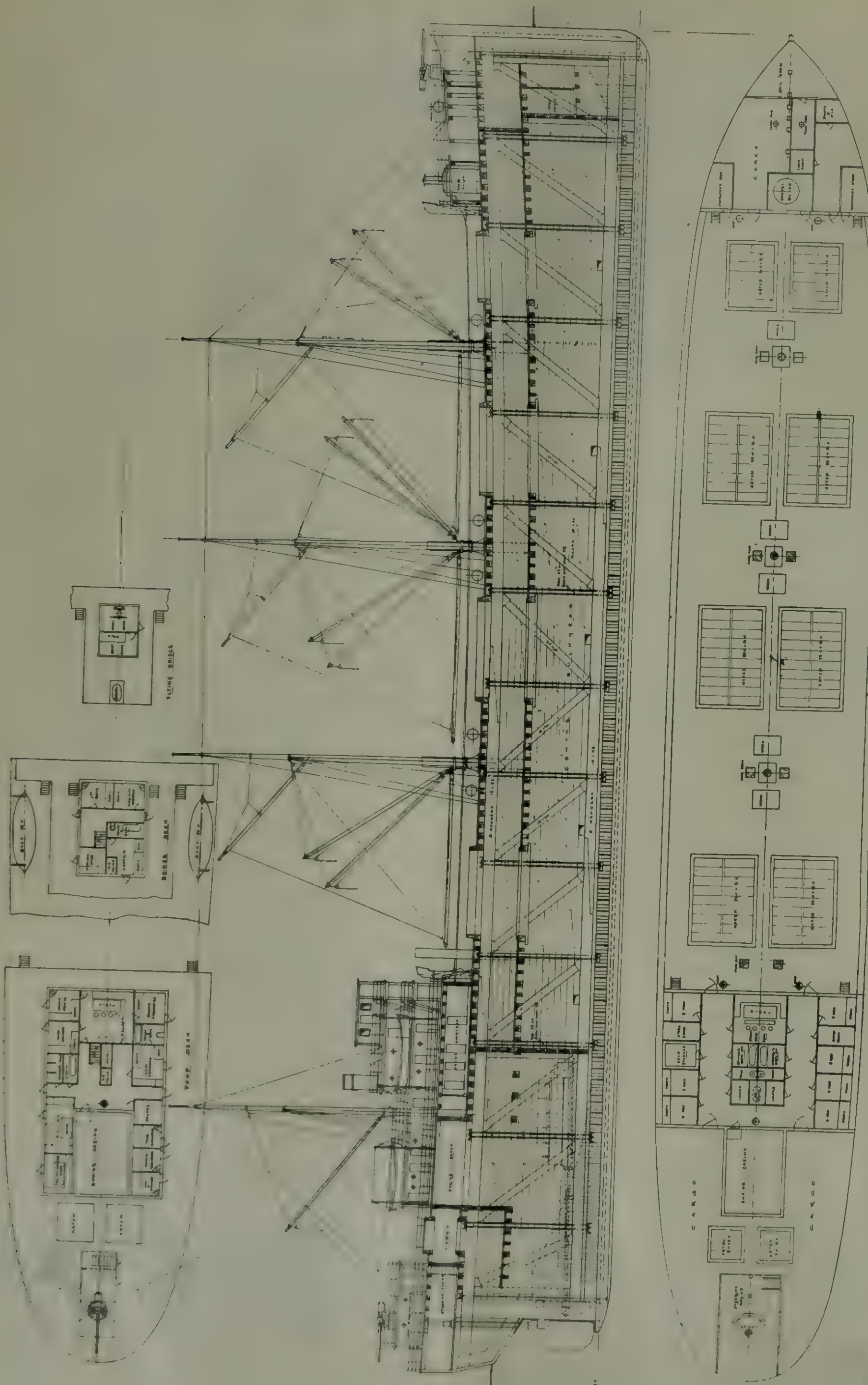
Modern shipyard practice has now intensified this old system. A building-slip flanked by a series of Wellman-Seaver-Morgan hammerhead cranes of the latest design provides an intensity of service that permits construction to be speeded to a rate that not so very long ago would have been considered impossible.

These cranes have a reach of 95 feet and this large radius of operation permits of active employment at all times. Their position being fixed, the workmen become familiar with the movement of material about them and pay no attention to the crane, while with traveling cranes there is generally a detracting effect upon the attention of the men. These cranes are also simple in construction and can be quickly installed, an important feature

6-ton double cantilever crane at Mare Island Navy Yard.



10-ton shipyard gantry crane at the American Shipbuilding Company's yard, Lorain, Ohio.



Plans of a wooden ship 355 feet over all, 338 feet between perpendiculars, 56 feet 4 inches moulded beam, 58 feet extreme beam, 36 feet moulded depth, 19 feet 6 inches depth of hold, and 10 feet clear 'tween-deck space. This vessel would be powered with two 1000-hp. engines. The design is by R. T. Stone, President of the Terminal Shipbuilding Company.

in these days of frenzied demand for speed in the construction of new shipyards as well as ships.

While the hammerhead crane is a splendid shipyard instrument, it by no means follows that it is suitable to all shipyard lay-outs. A small compact yard might well find a double cantilever or a gantry crane much better suited to its purposes, but in large yards where the output is great, the hammerhead crane, such as is manufactured by the Wellman-Seaver-Morgan Company, possesses undeniable advantages.

A Large Wooden Vessel

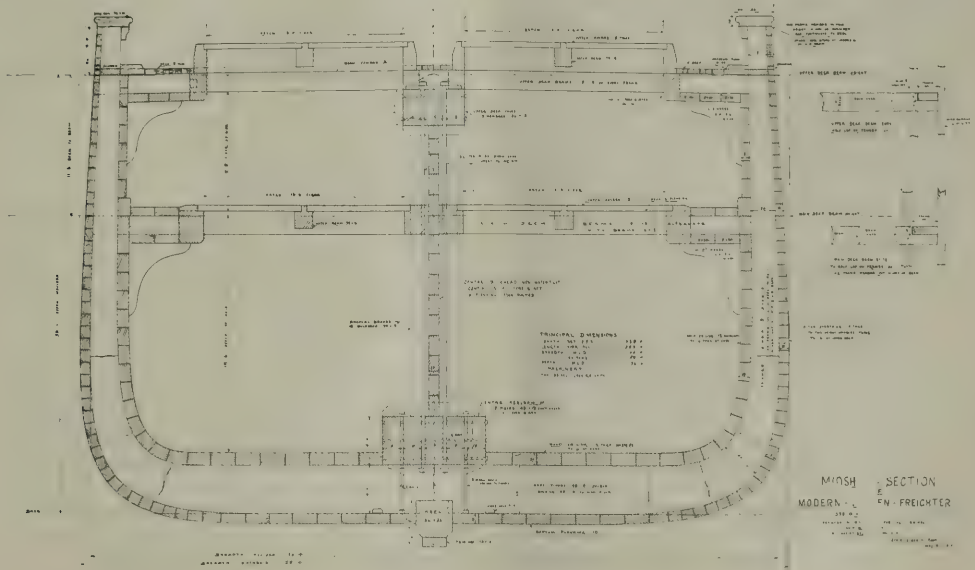
THE plans shown herewith were prepared in the offices of the newly formed Terminal Shipbuilding Company, whose yard is located near Vallejo. The plans delineate several constructional features of interest, notably the center-line bulkhead truss and the method of stem and stern-post construction.

The keelson is 10 by 20 inches in 96-foot lengths and has 10-foot scarfs. The keel, keelson and sister keelsons are tied together with 1½-inch drift bolts spaced 30 inches and staggered, each drift bolt running through 2 2/3 layers, and each layer of keelson being drifted to the preceding layer.

The keel is 36 by 36 inches, in three lengths, with 20-foot scarfs, and is fitted with a 10 by 24-inch iron-bark shoe. The frames are in two layers, each 8 by 48 inches, and jogged into a boxing 12 inches deep with a 4-inch shoulder which prevents the frame from splitting down. The floor timbers are 14 by 48 inches, extend to the lower turn of the bilge, and are jogged in the same manner as the frames; they are bolted through and through to the frames with galvanized bolts. The planking is 10 inches thick to the main deck, and from there to the shear strake is 8 inches, and the ceiling is 12 inches thick.

There are five sister keelsons, 18 by 48 inches, with 20-foot scarfs, and these are bolted together transversely with six 2-inch bolts at each intersection of the vertical truss rods. On top of the keelson a solid bulkhead is built up as shown. This bulkhead is carried up to 3 feet below the upper-deck timbers, at which point a top cord of three members, each 18 by 36 inches, is built up and fastened the same as the sister keelsons, and on top of this structure the deck timbers rest.

Four 3½-inch rods with 4½-inch upset screw-ends pass through the spaces between the leaves of the keelson and the cord; these rods have extra heavy gib-plates through which the ends pass and on which the strains are taken. Between each set of rods there are two 18 by 24-inch diagonal braces, one on either side of the keelson directly opposite each other and bolted through and through with



Midship section of the R. T. Stone design showing arrangement of center-line bulkhead or keelson.

1½-inch galvanized bolts. This forms a truss similar in theory to a Howe truss draw-span, inasmuch as the main braces run longitudinally at the top away from amidships. With the bow or stern overhanging a wave, the strains go up the rods and down the braces towards midships.

The main-deck timbers are 18 by 18 inches, alternating with 12 by 18 inches.

The stem and stern posts are tennoned into the keel with tennons 12 inches deep. Each of these posts is 24 by 48 inches in size, and every fourth layer of the keelson will project forward and aft 18 inches the full size of the stick into mortises in the stem and stern posts. Where the stem passes through the top cord the middle-cord leaf is cut off and serves a similar function, being reduced in section to 8 by 24 inches, forming a large tennon. The two outside leaves of the top cord are cut off flush with the edge of the inner stem as shown. The treatment of the stern post is exactly the same. The inner stem is held in place further by two vertical rows of horizontal bolts which are countersunk on the forward end and pass through two vertical timbers 10 by 24 inches, one on each side, bolted firmly to the keelson. These horizontal bolts prevent the stem from working. Just aft of these timbers there are two 3-inch rods with 3¾-inch upset screw-ends which pass through the top cord and down through the keel as shown. These rods form an effective tie which prevents the stem from working upward out of the mortise in the keel, and they also serve as the first set of truss rods.

Shipping Finances

INCORPORATION papers of the Grand Trunk Pacific Alaska Steamship Company were filed at Olympia, Washington, on May 5.

The Holland-Amerika Line has declared a 55% dividend on its capital of 12,000,000 florins. The International Mercantile Marine holds 25% of the Holland-Amerika stock, and therefore will receive $660,000 in dividends. The line is also increasing its capital stock of 15,000,000 florins and holders have the privilege of subscribing at 300 per cent. The stock is now selling at 350, so this privilege is worth about $160,000 extra to the International Mercantile Marine.

During the year 1916 the American-Hawaiian Steamship Company paid dividends amounting to $250 per share. The stock has a par value of $100 per share and is selling around $1100. The indications are that the 1917 dividends will approximate close to $400 per share.

The Cunard Steamship Company showed a profit of £2,501,840. From this sum the income tax received £89,548; £138,569 interest on debentures; £1,470,177 to depreciation and £250,000 to reserve; a dividend of 10% on ordinary shares was recommended, and a bonus of 10% payable in fully paid 5% war loan stock. The dividend is subject to income tax; the bonus is free of tax.

Thomas Crowley, head of the Crowley Launch & Tugboat Company, and Andrew Mahony, both of San Francisco, purchased the North Pacific Steamship Company's vessels on May 8. The vessels are the "George W. Elder," built at Chester, Pa., in 1874, 1073 net tons, 250 by 38 by 21 feet in moulded dimensions; the "Breakwater," also built at Chester, is 37 years old, 793 tons, 201 by 30 by 19 feet moulded dimensions; and the "F. A. Kilburn," built at Fairhaven in 1904, 612 net tons.

The United Steamship Company of Copenhagen's report for the year 1916 shows a trading profit of Kr. 39,996,801. The sum of Kr. 5,047,877 is written off ships and property, Kr. 11,800,000 reserved for taxes, Kr. 2,314,892 for management commissions, Kr. 10,500,000 is placed in reserve; a dividend of 35% was paid and Kr. 357,129 carried forward. The balance-sheet shows the reserve account at Kr. 26,250,677, or 87.5% of the capital. The sea-going fleet of this company consists of 117 steamers and one sailing vessel, aggregating 181,677 tons; one coaling elevator, and ten tugs. The book value placed on the fleet is about $43 per gross ton.

In 1916 the Royal Holland Lloyd Company made a profit on trading of Fl. 10,907,465, giving an available profit balance of Fl. 11,047,898. The following disposition was made of this sum: Fl. 2,045,619 written off for depreciation; Fl. 3,000,000 carried to the reserve; Fl. 500,000 to pensions; Fl. 500,000 to repairs; Fl. 598,502 to legal reserve; Fl. 1,067,052 to profit taxes; Fl. 38,265 to interest on state loan; Fl. 720,300 to income tax; Fl. 720,300 to legal disbursements; Fl. 2,500,000 to a 25% dividend, and Fl. 11,908 carried forward.

The affairs of the (Dutch) Royal West Indian Mail are of interest on the Pacific Coast, as this is the concern which sold the "Colombia," "Ecuador" and "Venezuela" to the Pacific Mail Company. The accounts of this company for 1916 show a profit of Fl. 2,629,200 aside from the Fl. 2,244,042 advanced on new tonnage under construction. Depreciation on ships and other property absorbed Fl. 673,171; reserves for new ships, Fl. 1,750,000; other reserves, Fl. 112,000; liquidation accounts, Fl. 494,042; war tax fund, Fl. 600,000; and Fl. 578,000 was carried over. Three steamers, the "Prins Wilhelm II," "Prins Wilhelm III" and "Prins Mauritz" are building to replace the three steamers sold to the Pacific Mail.

The East Asiatic Company's accounts show a profit after providing for depreciation and taxes for the year 1916 of Kr. 6,160,216. Of this sum, Kr. 1,372,512 goes to depreciation, Kr. 4,445,106 to reserve, Kr. 25,000 to pension fund, and a 10% dividend is paid. On April 2 the capital was increased to Kr. 8,000,000 by issuing Kr. 4,000,000 from the reserve and one new share for each old one. A 10% dividend was also paid for these shares. The total distribution was therefore 120%, of which 20% was cash and 100% stock dividend.

The Parr-McCormick Steamship Company purchased the steamer "Fair Oaks" from the S. E. Slade Lumber Company on May 8.

THE OSAKA SHOSEN KAISHA'S HALF YEAR

The Osaka Shosen Kaisha's balance sheet for the half year ending December 31, 1917, shows that this concern had a most profitable term. The total profit for this six months period was 12,053,793.70 yen, of which 990,000 yen were transferred to the insurance fund, 1,320,000 yen to the repair fund, 828,000 yen to depreciation, 446,000 yen to the reserve fund, 225,000 yen to directors' and auditors' fees, leaving a net profit of 8,244,793.70 yen, which, with the amount brought forward from the previous term, made 9,044,270.01 yen available for distribution. This sum was disposed of as follows: To business extension fund 1,000,000 yen, to dividend equalization fund 1,000,000 yen, to dividend (10% per annum) 996,875 yen, to extra dividend (20% per annum) 1,993,750 yen, extra bonus to employees afloat and ashore 350,000 yen, written off for extra depreciation on the fleet 2,500,000 yen and carried forward to the following six months term 1,203,645.01 yen.

The fleet is given as numbering 109 steamers of 213,150 tons in service and nineteen steamers of 105,200 tons building.

The steamers of the North Pacific Steamship Co., formerly operated by C. P. Doe and recently purchased by Messrs. Hanify and Crowley, will hereafter be operated under the house flag of the Emerald Line. The vessels will, for the present, at least, be operated on their old runs, and the rapidly expanding firm of Struthers & Dixon will have charge of operations.

F. C. Knapp telegraphed orders for the laying of keels for two 290-foot wooden steamers at the Peninsula Shipbuilding Works. Knapp has been in Washington for some time discussing government contracts.

The E. K. Wood Lumber Company is to build a light-draft, twin-screw motor vessel, of about 170 feet in length and 40 feet beam, at Hoquiam.

The yearly report of the San Francisco and Portland Steamship Company to the Railroad Commission for the year ending December 31, 1916, contains the following figures:

Assets

Total fixed capital	$ 838,055.33
Cash and deposits	412,172.75
Accounts receivable	150,183.27
Working assets	14,136.65
Prepaid expenses	23,515.79
Miscellaneous	12,871.59
Total	$1,450,935.38

Liabilities

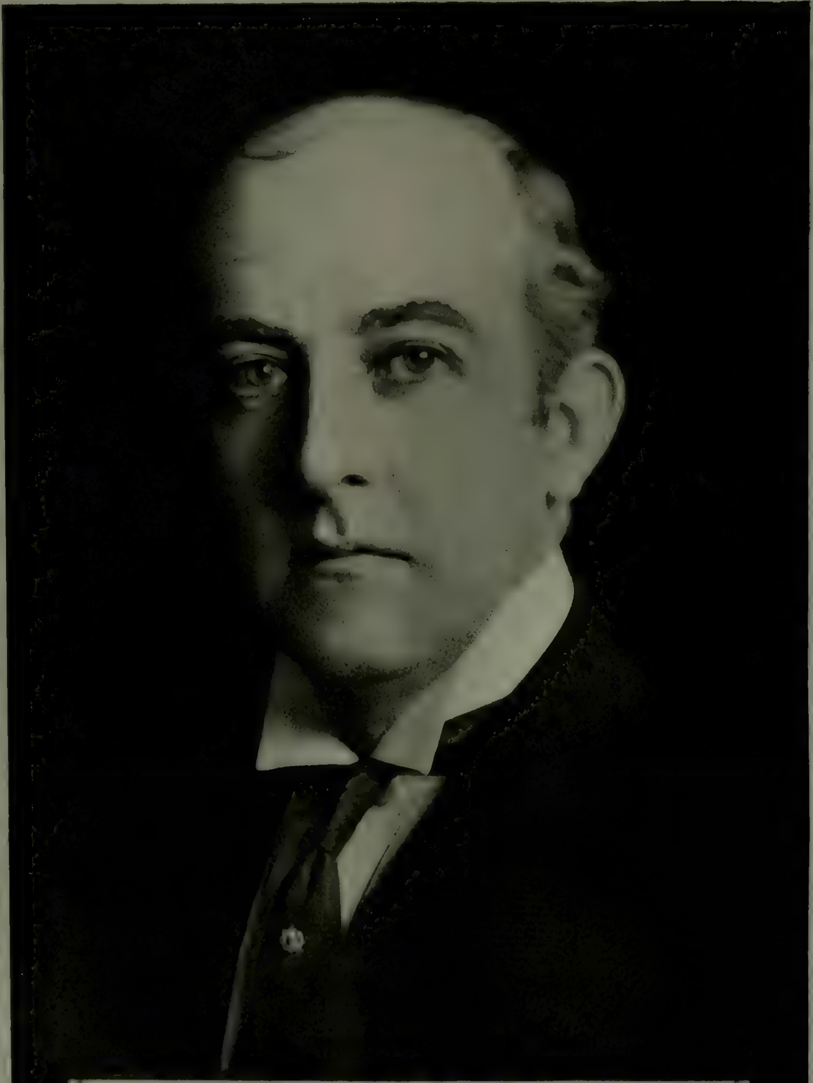
Capital stock	$ 500,000.00
Funded debt	275,000.00
Accounts payable	121,263.15
Interest and taxes accrued	6,679.18
Miscellaneous	21,703.86
Reserves	214,364.08
Corporate surplus	311,925.11
Total	$1,450,935.38

Income and Profit and Loss Account

Operating revenue	$814,324.76
Operating expenses	906,047.94
Net operating loss	$ 91,723.18
Non-operating revenue	560.10
Gross corporate loss	$ 91,163.08
Deductions:	
Interest accrued on funded debt	$ 16,500.00
Other interest deducted	422.68
Rent deductions	31,602.94
Total deductions	$ 48,145.92
Net corporate loss for year	$130,308.70
Miscellaneous additions to income	65,036.61
Miscellaneous deductions from income	29,595.65
Surplus on December 31, 1915	$385,793.85
Surplus on December 31, 1916	$311,925.11

The steamers "Protesilaus," "Talthybius" and "Ixion," of the Blue Funnel Line, have been commandeered by the British government. This means a still further shortage of ships out of Puget Sound ports, although both the Osaka Shosen Kaisha and Nippon Yusen Kaisha are making strenuous efforts through diverting extra tonnage to the Sound to meet the threatened freight congestion.

The Port of Astoria Commission has purchased the 20-inch suction dredge "Natona" from the Pacific Dredging Company of San Francisco. The price is said to be in the neighborhood of $85,000.



WILLIAM F. TURNER, MEMBER OF THE BOARD OF MANAGERS OF THE HILL LINES.

WILLIAM F. TURNER

William F. Turner, Comptroller and Member of the Board of Managers of the Hill rail and steamship lines in the Northwest since 1910, was elected Vice-President of the same companies under L. C. Gilman, President, in May 1916, and on January 1, 1917, in addition to other duties, he was placed in direct charge of the affairs of the Great Northern Pacific Steamship Company.

Mr. Turner's rapid rise and success in the management of the ships owned by his company, the steamships "Great Northern" and "Northern Pacific," are phenomenal and a revelation to the accounting world, for it is generally conceded that accounting men seldom become operating officials.

Mr. Turner is said to be the youngest Vice-President in charge of traffic and operation of any large water carrier organization in the country. The unusual part of his relations with his organization is due entirely to the personal qualities and characteristics of the man. He has a kind word and shows consideration for everyone. He is a man of quick, firm decision, and when he has passed judgment upon a matter it is so near correct that no one can censor it. He is absolutely fair in all his dealings and has the faculty of inspiring confidence with his superiors and his subordinates as well as with the general public. His counsel and advice is therefore sought by many men and employees in the service. His specialty is organization, efficiency and economy, and his principles are of the highest standard; consequently he enjoys the respect of all.

Mr. Turner received his early training and experience with the Southern Railway Company at Washington, D. C. When a mere youngster he was placed in charge of the cotton statistics of that system. He watched carefully the movement of cotton from the Southern States to all points via rail and water lines, and particularly the proportion destined to Eastern cities for export via ocean steamers.

Afterwards, he was assigned to handle the steamer accounts and to check and audit the rail and water traffic of the same system, and it was during this period of his career that he developed talents for expert organization. By close study of these statistics and accounts, he was able to work out a considerable saving in expenses without impairing efficiency in the service.

Later on, Mr. Turner severed his connection with this company and entered the service of the Delaware, Lackawanna & Western Railway Company at New York. His experience in handling lighterage, docks and terminal facilities for that company also gave him an insight into the steamship business, so that when he was placed in charge of the operation of the big turbiners owned by the Great Northern Pacific Steamship Company he was entirely qualified as demonstrated to "fill the bill." He immediately proceeded to establish an economical organization for his company, and it took just thirty days to pull the company out of the "red" and to put it on a paying basis. He is a steamship genius and promptness is his by-word.

PERSONALS

Mr. Drew Chidester, who was connected with the Dodwell interests for some eighteen years at Tacoma and later at San Francisco, inaugurated the Trans-Oceanic Company on May 1st. The firm will act as freight contractors and forwarders and will confine its business to the Orient until the close of the war, at which time European business will be handled as well. Mr. Chidester has had a wide experience in the feighting end of the steamship business and stands high in the estimation of the shipping fraternity.

A. O. Andersen & Co., Inc., announced on May 1 that Mr. Frank K. Hitching would assume charge of their San Francisco office. The business will be continued in the same manner as before under the management of Mr. V. Reimann, and the steam and sail chartering departments will be handled by Messrs. Herbert Dormand and H. J. Syversen as heretofore.

Mr. J. R. F. Servaes has been appointed manager of the newly formed marine department of Edward Brown & Sons, a prominent San Francisco insurance brokerage firm. Mr. Servaes learned the marine insurance business in the large offices of Liverpool and New York, and during the past nine years has been on the Pacific Coast with such brokerage firms as Stewart S. Lowery & Co. and M. Thompson & Co.

A special meeting of the Board of Directors of the Independent Pneumatic Tool Company was held in Chicago on May 3rd for the election of a President to succeed the late James Buchannan Brady. Mr. John D. Hurley, who has been Vice-President of the Company since its organization, was elected President. Mr. Hurley is well known in the pneumatic tool business, having been identified with this industry since pneumatic tools were first placed on the market. Mr. Ralph S. Cooper, who has been the manager of the New York office for the past twelve years, was elected Vice-President, and Mr. Robert T. Scott, Manager of the company's Pittsburg branch, was elected a Director and member of the executive committee.

Mr. J. H. Welsford, President of the Union Steamship Company, of British Columbia, died recently at his home in Liverpool. Mr. Welsford secured control of the Union Company in 1911.

Captain Archie L. Pease, for years the Secretary of the Columbia River Pilots Association, has resigned that post and will hereafter be an independent pilot.

Engineering and business circles up and down the Coast were deeply grieved to learn of the death of Mr. John J. Avis, Secretary and Treasurer of Chas. C. Moore & Company of San Francisco, which occurred on April 20th. During Mr. Moore's active connection with the Panama-Pacific International Exposition, Mr. Avis had many extra responsibilities to shoulder and his keen insight into business and engineering affairs coupled with a charming personality won him numberless friends up and down the Coast.

The well known Los Angeles firm of Leeds & Barnard, Los Angeles, wish to announce that Capt. Charles T. Leeds, having offered his services to the government for the period of the war, has been assigned to active duty in charge of the United States District Engineers' Office at Los Angeles. Permission has been granted by the Chief of Engineers for the continuation of the business of the firm by Mr. Barnard under the firm name. All active work will be handled by Mr. Barnard, in consultation with Captain Leeds only on matters which do not touch upon his duties as United States District Engineer Officer. As in the past, consultation will be given and work accepted in the making of reports, valuations and appraisals, and in the design and supervision of construction of highways, railroads, irrigation systems, river and harbor improvements and flood-control works.

D. W. Sumner, the inventor of the Sumner semi-Diesel engine, the first large commercial installation of which was placed on the "Santino" and fully described in the May issue of the "Pacific Marine Review," was a recent visitor to San Francisco. Mr. Sumner is making the voyage East on the "Santino" with a view to ascertaining points where the design of the Sumner engine can be still further improved. It is his intention to follow the careers of all vessels equipped with Sumner engines closely and from the experience gained steadily improve the Sumner engine in every possible way.

Benjamin Hedstrom, formerly chief daughtsman for the Moore and Scott Iron Works, became supervisor of Government work at the Potrero plant of the Union Iron Works on April first. Mr. Hedstrom is a San Francisco man and served his apprenticeship in the Union Iron Works and later took the naval architecture course in Glasgow university.

Captain J. F. Blaine, formerly with the Pacific Coast Steamship Company, and at various times connected with the Steamboat Inspection Service, has been named as the Federal Shipping Board's Northwest representative, with offices in Seattle.

AN IMPORTANT COMMITTEE

The subcommitee appointed by the National Council of Defense to take up the question of the immediate diversion of a number of coastwise vessels to the trans-Atlantic service is made up as follows: William Denman, Chairman of the U. S. Shipping Board, chairman; P. A. S. Franklin, President of the International Mercantile Marine Company; H. H. Raymond, President of the American Steamship Association; Eugene T. Chamberlain, Commissioner of Navigation; D. T. Warden, Manager of the Foreign Shipping Department of the Standard Oil Company; L. H. Sherman, Vice-President of W. R. Grace & Co.; Frank C. Munson of the Munson Steamship Line, and A. H. Bull, of A. H. Bull & Co.

This committee is calculated to insure the confidence of shipowners, as the purpose is not to withdraw vessels from trade which cannot be adequately served by the substitution of other tonnage or by railroad carriage.

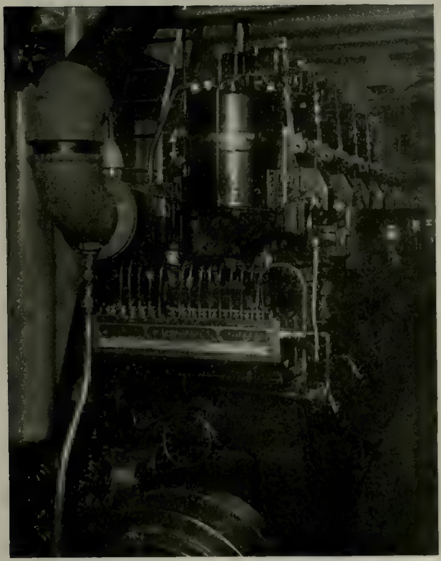
The revenues of the public docks at Portland, Oregon, are showing a healthy increase. The report of G. B. Hegardt, Chief Engineer of the Dock Commission, shows that April 1917 returned $1542.09 more receipts than April 1916. The increased business of the river fleets is largely responsible for the increase. The tariff on cement in storage has been changed from 25 cents per ton for the first month and 10 cents for succeeding months to 25 cents for the first five days and 25 cents for each succeeding thirty days.

W. C. Dawson and H. F. Ostrander, purchasers of the steamers "Al-Ki" and "Despatch" from the Border Line Transportation Company, organized the Seattle Steamship Company, on May 10, for operating these vessels in the Alaskan trade.

Mr. John S. Hyde, President of the Bath Iron Works, and one of the best known ship builders and engineers on the east coast, died at St. Augustine, Florida, on March 17. The Bath Iron Works was consolidated for a number of years with the Hyde Windlass Company, but in 1902 the plants were separated and the Bath Iron Works was purchased by John S. Hyde, who rapidly developed it into a splendid plant. A large number of torpedoboat destroyers were constructed for the Government here and these boats made a fine record for the plant, being all remarkably speedy and reliable boats.

The Overseas Shipping Company, a Chicago exporting house with numerous stations, has established a branch office in Seattle in the L. C. Smith Building with Mr. C. A. Lockhart in charge.

In and About Seattle



The Southwark-Harris engine in the ferryboat "Robert Bridges."

The net profits of the Booth Fisheries Company, of which the Northwestern Fisheries Company is a subsidiary, were $1,659,295.20 for 1916, an increase of $616,524.63 over the previous year.

Pier A, operated for the past five years by the Washington Street Dock and Warehouse Company on a lease from the Pacific Coast Coal Company, was taken over by the Pacific Steamship Company on the first of the present month. The Nome and St. Michael business of the Pacific Steamship Company will all be handled from this pier and after the Alaska season the dock will serve as an outlet for the company's overflow business.

One of the concerns called into existence by the heavy shipbuilding programme in Seattle and other Puget Sound centers is the Pacific Metal and Galvanizing Company. This plant will occupy a site at the corner of Hanford street and Whatcom avenue and will have a capacity of 5,000 tons of galvanized material per annum. Mr. C. H. Rhodes, formerly with the Seattle Construction and Dry Dock Company, is President of the plant and the other directors are all Seattle men.

NEW RADIO SERVICE

Fortifying Seattle's important position as a great producing and distributing center, the Shipowners' Radio Service, Inc., of Seattle, which will have direct charge of $500,000 worth of wireless equipment on a total of 200 vessels, has just been completed by the Kilbourne & Clark Manufacturing Co., whose San Francisco address is Fife Building.

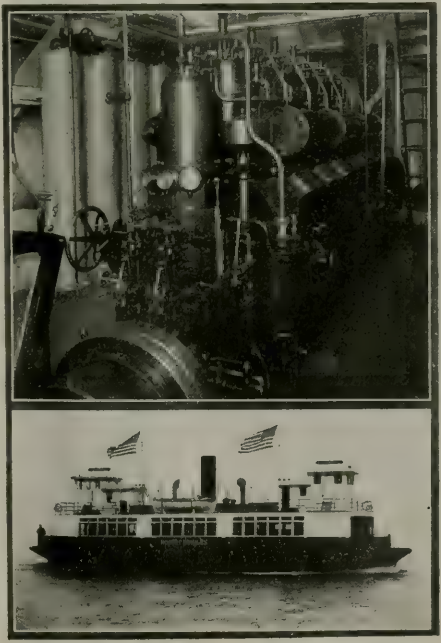
The Ship Owners' Radio Service, Inc., is a subsidiary company of the Kilbourne & Clark Manufacturing Co. and has opened its general offices in the Polson Building, 71 Columbia Street, Seattle. C. A. Kilbourne, President of the Kilbourne & Clark Manufacturing Co., is President and Treasurer, and F. G. Simpson, inventor and patentee of the wireless apparatus to be used, is Vice-President of the new corporation.

C. B. Cooper, former radio superintendent of the Alaska Steamship Co., is General Superintendent and will be the active head.

"The Ship Owners' Radio Service, Inc., has been organized to take over the supervision of wireless departments of steamship companies which use the Kilbourne & Clark radio apparatius," said Cooper. "It is the intention of the company to establish service branches in New York, San Francisco, in all the principal ports of the United States, and eventually in foreign countries.

"Each branch will have an inspector and a manager whose duties will include the general care and repair of wireless apparatus of various ships coming under their jurisdiction.

"Our radio service will also furnish all operators, handle all messages, and do the wireless accounting for the steamship companies, which have each



The "Robert Bridges" and one of her Southwark-Harris engines.

The "Al-Ki" and "Despatch," two former Border Line Transportation Company craft that have changed hands.

had a department for this work. There are now approximately 200 ships equipped with the Seattle-made Kilbourne & Clark wireless apparatus, valued at $500,000, and about 200 additional ships have been contracted for. The steamship companies will continue to own the wireless apparatus, but we will operate it for them and see that it gives satisfactory service."

Cooper states that the Ship Owners' Radio Service, Inc., will have twenty branch offices, all reporting to the general headquarters of the Service in Seattle. The Service will have charge of wireless equipment aboard a total of sixty-one vessels on the Pacific Coast, and ten wireless stations in the North are operated in connection with various salmon cannery plants.

Wireless equipment will be under supervision of the Ship Owners' Radio Service, Inc., aboard seventeen vessels of the Alaska Steamship Co., nine vessels of the Pacific Steamship Co., six vessels of the Pacific American Fisheries, four vessels of the Puget Sound Tugboat Co., three vessels of the fleet of Libby, McNeill & Libby, two vessels owned by the Columbia River Packers' Association, two vessels of the Booth Fisheries Co., one vessel of the Northwestern Fisheries Co., three tugs operated by the Port of Portland, two vessels of the Coastwise Steamship & Barge Co., one vessel of the San Juan Fisheries & Packing Co., two vessels of the Columbia Contract Company of Portland, one vessel of the Behring Sea Packing Company of Everett, two vessels of the Alaska Packers' Association, and six vessels of the J. A. McEachern Company, Inc., two of which have already been equipped.

A MUCH NEEDED INDUSTRY

The Pacific Construction and Engineering Company will shortly inaugurate a highly important industry for Seattle and the whole Pacific Coast. Ground was broken three days ago on Whatcom Avenue, near Forest Avenue, for the finest forging plant west of New York. One class of work to be specialized upon for the present is heavy shafting, stern frames, rudder stocks, rudder posts, connecting rods, piston rods or, in fact, any other class of heavy forgings desired, whether for marine or stationary work. Powerful quick-acting hydraulic forging presses will do this work, with the perfection due to the finest possible equipment, both of machinery and men. The quick-acting hydraulic forging press is the recognized standard for making heavy forgings in this country as well as in Europe, and the recognition given to this press is due to the fact that heavy forgings made by it are superior to forgings made by the steam hammer.

The finished product is more sound throughout. The blows from a steam hammer on a large ingot is limited to a chiefly surface action on the steel, tending to overlap and attenuate possible defects, while the quick-acting hydraulic forging press works the metal throughout its section. In doing so, the steel is solidified, thus eradicating such possible defects. When cut apart the hammered section shows a distinctly open grain of metal towards the center, whereas the pressed forging shows a finer and practically uniform texture throughout its entire section.

The drop hammers are of the most modern type and are used with dies for making numbers of parts of the same kind, such parts being produced rapidly, accurately and at moderate cost. In connection with these drop hammers, the trimming press is used for removing fins left by the dies. Where numbers of identical parts are used, drop forgings will undoubtedly take the place of steel castings and be very much stronger. Steam hammers are also being installed, of the newest and latest type, and will produce ordinary forging work at the lowest prices possible. Large, powerful motor-driven lathes are being installed for rough-turning shafts, connecting rods, piston rods, etc., so that competition will be on the same basis as in the East, and forgings will be known to be good before leaving the plant.

In connection with the presses, drop hammers, and steam hammer, the whole central shop will be served by three-motor overhead electric cranes, giving rapid and efficient service to all large tools, the side wings being served by overhead hand traveling cranes. A large battery of oil burning furnaces will heat the billets and ingots serving all the forging apparatus, giving a steady, even heat.

A spur track is run into the plant, laying and removing material directly under the overhead cranes. Large annealing furnaces of the latest design, equipped to burn oil, and of capacity to take the largest forgings are used for the relief of any undue strain developed during the forging process. A large power plant is installed, with oil burning boilers, giving abundance of steam and power for the operation of the tools. As demands increase, facilities, if required, will be added from time to time.

Mr. Robert C. Monteagle is President and General Manager of the company, and Mr. James Bingham is General Superintendent of the forge shops. In past years, most of the heavy forgings enumerated above have been made in the East. From the time the Pacific Construction and Engineering Company's plant gets into operation, this condition will undoubtedly change, as the equipment described above will successfully compete with any Eastern forge shop. Finally, and to the credit of the shipyards of the Pacific Coast, they realize the importance to their own interests in giving their undivided support to this enterprise.

The Portland District

PORTLAND is getting ready for the shipbuilding drive which the government has promis shortly to begin. New yards are being planned, present yards expanded, and labor and material being congregated for the big effort.

The moment press dispatches carried news that wooden ships were to build, the Portland shipbuilders swung into action. Under the leadership of the Chamber of Commerce, a conference of all interested factors was called.

Loggers commenced heading their gangs for the long timbers for which Oregon is famous, with the intention of increasing capacities. The lumber mill owners commenced stacking material in their yards of the kind the shipbuilder will need.

Bankers conferred with the shipbuilders to arrange for the carrying of such increased material accounts, payrolls and building accounts as might be necessary.

The United States Department of Labor, Municipal Employment Bureau and Central Labor Council officials made up another conference which undertook the registration of every available man for shipbuilding work.

New yards were announced by several concerns.

Sommarstrom Brothers of Oakland purchased a site at Columbia City, 600 feet in river front and 1000 feet deep, and leased an adjoining site 500 feet in river frontage and 800 feet in depth. Columbia City is two miles below St. Helens, where the McCormick mills and St. Helens Shipbuilding Co. are located. The concern is to build ships at once on its own account, selling them to the government if satisfactory or to private individuals or perhaps even operating them themselves.

The Motorship Construction Co., incorporated by Merrill Reed and associates, commenced work on a site at Vancouver, Wash., ten miles from Portland. L. B. Mefiefee and associates began work on another yard at the same port. The two yards are expected to be able to build eight vessels at one time.

The Heath Shipbuilding Plant, partially ready but without contracts, was taken over by the Coast Shipbuilding Co., incorporated by Arthur M. Sherwood and associates some time ago, and H. E. Pennell, well known lumberman and shipowner, announced as manager.

H. F. McCormick, of the St. Helens Shipbuilding Co., made arrangements with the Port of Portland for the filling of additional land above their yards for ways.

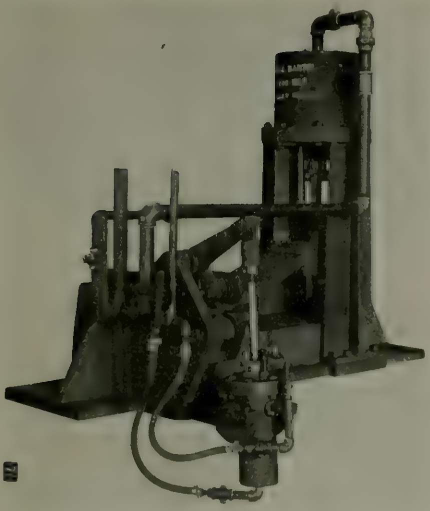
The Peninsula Shipbuilding Co., Standifer-Clarkson Shipbuilding Co., Columbia Engineering Works and the McEachern Ship Co. of Astoria all announced that they were ready to increase their facilities for turning out such ships as the government wished.

Meanwhile the steel yards were not behind. J. R. Bowles, president of the Northwest Steel Co., received word from the government to prepare his yard for government work. Material deliveries are to be hurried by the government, that private contracts may be finished and all attention directed towards the work the government wants.

Bowles announced that his yard and the Columbia River Shipbuilding Co., in conjunction with the Willamette Iron & Steel Works expected to be able to turn out fourteen hulls annually the moment deliveries were hurried up. Seven additional ways will be built if necessary, and the working force more than doubled.

The steel plants were especially jubilant in the satisfaction expressed by the government with the 8800-ton ship being built by them. System has been invoked into this work to such an extent that the builders believe they will shortly be able to compete even with the high-speed yards of Europe, and the governmental recognition was welcome.

Messrs. C. S. Miller, A. E. Davidson and W. H. Gatward, all experienced steamboatmen of Spokane, Washington, have organized the Miller Navigation Company, to operate river boats on the upper Columbia. Their first steamer is now building at Kelso, Washington.



The Hesse-Martin pneumatic bolt header.

A PNEUMATIC BOLT HEADER

The accompanying illustration shows a machine which should be of considerable interest to all shipbuilders. This is a pneumatic bolt header designed and manufactured by the Hesse-Martin Iron Works, of Portland, Oregon.

The development of the header was brought about by the inability of the shipbuilders to obtain bolts of the various lengths in sufficient quantities. In many cases they were compelled to cut to the proper length and rethread the sizes obtainable. The fact that all shipyards are provided with an ample supply of compressed air, whereas steam is seldom used, prompted the designers to adopt compressed air for power.

The header has a capacity of approximately 2000 bolts per day and can readily be operated by one man. The small cylinder in the lower part of the illustration operates the clamping dies, while the larger cylinder at the top, acting through a heavy toggle lever, operates the heading die.

The machine is capable of handling stock up to 1¼-inch in diameter for full button heads, or 1⅜-inch for oval heads.

Dies for all shapes of head and all sizes of stock up to the above mentioned sizes can be furnished by the manufacturers.

The extreme flexibility and the simplicity of operation are features which have won for this machine an enviable record among its users. Shipyards in which the header is now in operation report a saving of over $30 a day as against buying headed bolts.

THE LUNKENHEIMER COMPANY'S NEW FERROUS FOUNDRY BUILDING

The marvelous growth of The Lunkenheimer Company of Cincinnati, Ohio, universally acknowledged the largest manufacturers of high-grade engineering specialties in the world, has recently made necessary the erection of a more commodious building for the casting of their great number of products made of ferrous materials.

The new foundry occupies an area of 36,000 square feet and the pattern-storage building an area of 18,000 square feet, the latter building being four stories in height. Both the pattern-storage and foundry buildings are of reinforced concrete. Provision has been made to add two more floors to the pattern-storage building, and the wall at one end of the foundry is so built as to enable easy removal to further extend this building when more space is required. Excellent light and any degree of ventilation is afforded by the saw-tooth roof construction of the foundry together with the large number of Fenestra windows used.

Great precaution has been taken to guard against fire, a sprinkler system having been installed, and wherever possible fireproof material is used throughout the buildings.

The floor of the foundry building is of creosoted wood block, which makes an excellent smooth surface, exceptionally durable and easily repaired.

Cut 1—Lunkenheimer New Ferrous Foundry Building, Ready for Occupancy March 24, 1917.

A washroom for the employees adjoins the foundry, and it is pleasing to note the cleanliness that prevails in this room which is due to the constant care given it by janitors. A sufficient number of shower baths are also provided for the employees, and each have their own steel lockers in which to hang their clothes.

For the melting of iron, a cupola having a capacity of ten tons per hour is used. The molten metal is poured from the cupola into large crucibles mounted on wheels which are easily pulled on rails to the destination intended. These large crucibles can be tilted in order to fill the small ladles used in pouring the metal in the molds.

Compositions of other ferrous materials are melted in revolving furnaces of Lunkenheimer design, these furnaces being particularly adapted for the necessary special treatment of the various ferrous compositions used in Lunkenheimer products.

Six traveling cranes, the majority of which are electrically operated, are provided for handling the heavy work, and every department or appliance necessary for the efficient operation of an up-to-date foundry are present and arranged in systematic relation with each other.

Directly in rear of the Lunkenheimer foundry is a railroad from which a spur is run to a concreate storage house. All the sand, coke and other materials needed are thereby conveniently obtained and delivered with the least possible handling.

The great rush of business made it imperative that all material and machinery be moved from the old foundry building to the new (a distance of about a city block) in the shortest possible time.

Cut 2—Lunkenheimer New Ferrous Foundry Building, Occupied March 26, 1917.

That no time was lost is evidenced by the photographic reproductions shown in Cuts 1 and 2, the former view having been taken Saturday noon, March 24th, and shows the building practically empty, and the latter view taken Monday morning, March 26th, shows the great quantity of material which had been moved during this short period and which enabled many molders to continue their work without loss of time.

The foundry for making non-ferrous castings, such as bronze, brass, aluminum, nickel, etc., compositions, is located in another building.

Chief among the engineering appliances manufactured by The Lunkenheimer Company are Globe, Angle, Cross, Check, Gate, Pop Safety, Relief, Blow-off, Non-return Boiler Stop, and Throttle Valves; Water Columns and Gauges; Whistles and Cocks; Unions and other Pipe Fittings; Injectors and Ejectors; Cylinder Lubricators and Oiling Devices; Oil Pumps; Oil and Grease Cups and Motor Accessories.

The company maintains branches in New York, Chicago, Boston and London, but their products are carried in stock everywhere by all leading supply houses.

ENGINES FOR SALE

In these days of intense demand for propelling machinery for ships, the above heading is bound to attract unusual interest. Indeed, it is rather startling to learn that there are four 1250-horsepower triple-expansion engines for sale. These units have cylinders 20, 30 and 44 inches in diameter by 30 inches stroke; were built by the Union Iron Works of San Francisco; all cylinders are steam jacketed and have removable liners, and delivery can be made within three or four months. The Crisp Engineering Company, of 24 California Street, who have these engines at their disposal, stand ready to take charge of their installation for purchasers and can make prices that are extremely attractive in the face of present conditions in the machinery market.

ELECTRIC STEERING

It is interesting to note the extent to which electricity is displacing steam as a motive power for the deck auxiliaries of all classes of vessels. The electric winch and the electric windlass, although familiar enough in our navy service, have only begun to appear on Pacific Coast boats where these devices have already created quite an impression on account of their splendid performances.

No application of electricity on shipboard has awakened greater interest, however, on the San Francisco waterfront than the electric steering gear on the Charles R. McCormick motorship "S. I. Allard." This gear was designed and built by the Herzog Electric & Engineering Company, of 150 Steuart Street, San Francisco, a firm that has several innovations in deck machinery to its credit. The outstanding features of this electric steering gear are as follows: the power used can be taken off the electric-light plant and is negligible, the gear absorbing only from 1½ to 2 horsepower; the space occupied is extremely small; the control is positive and simple, and the operation noiseless, and finally there is no opportunity for derangement such as may well occur in steam gears through leakage in the glycerin-filled control pipes leading to the bridge or the flexible joints in the steam piping.

The success of this gear has been so marked that all the new McCormick boats will be similarly fitted.

Group of Brown Brothers' welding operators, showing the extent to which this young business has grown.

BROWN BROS. WELDING COMPANY

Welding by means of the oxy-acetylene flame is a very versatile process and can be applied to most of the metals used in the mechanical arts. In the blacksmith's weld the pieces of metal are heated to the proper temperature and hammered together, any slag or impurities which cannot be squeezed out in the hammering process remaining incorporated in the weld.

In the oxy-acetylene process, on the other hand, the metal is actually melted by the flame, and, if the work is done properly, all impurities are floated to the surface of the metal as the operator progresses, leaving the metal in the weld as clean and pure as if it were poured from a ladle. Owing to the fact that there is an actual fusion in this process, all metals can be welded, and different metals, cast iron and steel, for instance, can be welded together.

In welding different kinds of metal together, their melting points, of course, must be approximately the same. Aluminum cannot be welded to steel any more than we can weld lead to steel, owing to the wide gap between their melting temperatures.

One of the most prosperous and rapidly growing welding firms on the Coast is that of Brown Brothers, San Francisco. This firm held its anniversary banquet on the first of May, and among those present were some forty experienced operators of the firm's large force. As the first banquet was attended by just two people, some idea may be formed of the growth of this firm, and also of the rapidly extending use of the oxy-acetylene process.

CONCRETE SHIPS

Interesting developments may be looked for following the incorporation of a shipbuilding company to build, equip and try out a concrete ship after the process worked out by Allan Macdonald and Kenneth Macdonald, Jr., of San Francisco. Only meager details are available at present, but it is understood that the vessel will be about 280 feet in length by 45 feet beam, and will be a two-decker. Those mentioned in connection with the new concern are Leslie Comyn of Comyn & Mackall, John Lawson of Balfour, Guthrie & Co., John A. Hooper and E. A. Christenson.

Concrete Barges, dock caissons, and other craft are by no means new to the marine world, but the Macdonalds believe they have a formula for concrete that will possess sufficient elasticity for building large ocean-going vessels. If the vessel is built she will probably be towed on several ocean voyages to thoroughly demonstrate her strength and practicability before propelling machinery is installed.

WHITE BROTHERS' BULLETIN

Bulletin No. 5, issued by White Brothers, the leading hardwood dealers on the Pacific Coast, contains the following interesting forecast on the hardwood situation:

The state of uncertainty regarding the entry of this country into the war disturbed conditions in the hardwood lumber business to a slight degree only. The very general healthy condition of business in all lines, which has existed for a considerable length of time, has apparently strengthened the commerce of the country to such an extent that it can withstand what under other circumstances would produce very uncomfortable results. The extraordinary development of our foreign trade has strengthened the financial condition of the country so that we need have no fear of any sudden slump in general business and particularly in the hardwood line. On the contrary, the increased activity in preparing our Army and Navy for the war which we have now entered is drawing to a great degree upon the substantial stocks of hardwood in the hands of Pacific Coast dealers.

The country at the present time is suffering from the worst freight congestion which has ever been experienced. However, the San Francisco hardwood yards in particular are well stocked, and there is sufficient hardwood lumber on hand undoubtedly to supply the ordinary wants of the trade until the freight situation clears up. On this point, however, it is difficult to foresee the effects of the mobilization of the country for war, and it is therefore better to provide for hardwood requirements from stocks now on hand at Pacific Coast points than to depend upon shipments from the East.

The general activity in building throughout the Pacific Coast is remarkable. Factory extensions constitute a great part of this activity, but the building of homes in the cities and towns shows a great increase, due for the most part to the increased earning power of the general workers.

Ocean freights have soared and tonnage is very difficult to obtain. This has had a direct effect on imported woods. Japanese oak as a factor in Pacific Coast trade has disappeared, for the time being at any rate.

The scarcity of tonnage is having a very salutary effect on the shipbuilding industry, both in steel and wood. Wooden ships before the war were gradually being eliminated, but now old yards which were practically dismantled are humming with the sounds of adze and hammer, and new yards are continually being installed. All woods which go into the construction of a wooden ship are in great demand all over the United States and particularly on the Pacific Coast.

Summing up the hardwood situation as it relates to dealers and consumers on this Coast, all conditions point to a period of tremendous activity.

THE "JOHANNA SMITH'S" MACHINERY

The "Johanna Smith," built by Kruse & Banks, of North Bend, Oregon, to the order of the C. A. Smith Lumber Co., and 266 feet long, 49 feet 11 inches beam and 14 feet depth of hold, will not be equipped with her engines until September, and in the meanwhile is being towed up and down the coast. This vessel, with her length and great beam, is one of the largest wooden lumber carriers ever built, and is fitted with special ballast tanks for the light trip north. She will be fitted with twin 750-horsepower De Laval steam turbines, and the auxiliary machinery will also be operated by turbines. The turbine work is all being supplied through the Herzog Electric & Engineering Co. of San Francisco, local agents for the De Laval marine machinery.

Repairs to the German ships "Kurt," "Arnoldus Vinnen" and "Dalbek" have been authorized by the Shipping Board, and the Collector of Customs, who seized them when war was formally declared, has turned them over to that department of the government. Capt. W. C. McNaught, marine surveyor, is in charge of the repair work, which is being done by Robert McIntosh and the Albina Engine & Machine Works. The Oregon drydock is being used.

Mr. H. L. Greene, Eastern Manager of the Amalgamated Paint Company.

THE AMALGAMATED ENTERS COAST FIELD

An announcement that is warranted to create widespread interest in marine paint circles in this city and on the Pacific Coast, is that of the entry of the Amalgamated Paint Company of New York into the local field. The Amalgamated is one of the largest marine paint manufacturers in the United States and, on account of the high quality of its products, enjoys a good share of the marine business on the East Coast.

Mr. H. L. Greene, the Eastern manager of the Amalgamated, is now acting as traveling representative on the Pacific Coast. Mr. Greene is well known to the old-time builders along the Pacific, and his wide knowledge of ship painting requirements will gain friends for him among the numerous new concerns and shippers. Warehouse stocks of copper, boot-topping, anti-corrosive and anti-fouling are carried on this Coast, and the Crisp Engineering & Equipment Company, of 24 California Street, exclusive agents for the State of California, are prepared to give immediate delivery. Up to the present time, Amalgamated composition has been applied to 5,500,000 tons of shipping of every kind.

LARGE GAS ENGINES

The Union Gas Engine Co. is at work on two 275-horsepower six-cylinder gas engines which will operate 180-kw. generators for a mining company in Arizona.

Freight Report

By PAGE BROTHERS

OUR last circular was dated 20th of March, and freights have advanced steadily since that time.

From the North no grain charters have been made, and wheat continues to be shipped from the interior of Washington and Oregon to the Eastern coast by rail.

The charter reported in our last of Norwegian steamer "Bessa" at $55 to Gothenberg, Sweden, from San Francisco and New Orleans, was later canceled owing to the shippers not being able to give letters of assurance, regarding the receivers of the cargo, satisfactory to the British Government. This fine new steamer has been lying here with her fuel oil on board for the last ten or twelve days. She has had various offers of business to different parts of the world which so far have been refused by the owners. She has been bid as high as 43/9 on the dead weight on time charter for about six or seven months, and for Pacific Ocean trading alone, which the owners have declined, owing, perhaps, to the fact that the owners still hope to charter her for barley from this port, if possible, to Christiania, Norway, as the British Government would then have no fears that the barley might eventually get to Germany. She has also declined 250/- per thousand feet from Portland to Bombay. Meanwhile, taking the above time charter into account, she is losing from $2000 to $3000 a day during her inactivity.

Mitsui & Co. have chartered steamer "Nankai Maru," presumably at about 17½ yen on the dead weight, and will berth her from Puget Sound to Kobe and Yokohama. They will also put on the berth from San Francisco in the same direction steamer "Miikesan Maru," which has just arrived with a cargo of sugar, hemp and copra from the Philippines under charter to Welch & Co. The N. Y. K. have chartered "Tenshyo Maru" for about nine months for their different trades at 17½ yen on the dead weight, charter to commence as soon as she arrives in Japan. The Pacific Export Lumber Co. have chartered "Saigon Maru" for lumber from Portland to Bombay on private terms. The Robert Dollar Co. will put steamer "Kaisho Maru" on the berth for China and Manila.

The Norwegian steamer "Thordis," which has just sailed from Portland with lumber to Bombay, is reported chartered on time, delivery Bombay, for a voyage from the Orient to this coast with redelivery either Seattle or San Francisco, at charterers' option, on a basis of about $11 per ton on the dead weight. Her lumber freight to Bombay grosses fully $210,000, and with the time charter back, the owners will have made one-third of her value on the one round. She cost them $940,000.

Comyn, Mackall & Co., who bought steamer "Hilonian" at $450,000 net from E. C. Horst Co., have resold her for delivery New York at $550,000, a quick and handsome turn in about a month or more. They have also sold the American Iron sailer "Phyllis" also to New York buyers at $275,000. If our memory serves us right, it was not more than a year or a year and a half ago that they bought this vessel and the "County of Linlithgow," since named "Katherine," at $140,000 for the pair. The star performers in the matter of reselling at a profit have been Walker, Armstrong & Co., of Savannah, who have resold the steamer "Eurana," launched here about a year ago, at about $2,600,000, and the steamer "Southerner," since renamed "War Knight," at about $3,000,000, which, on the reported cost for building, appears to show a profit of about $4,000,000. The China Mail Line are reported to have paid $1,000,000 for the American steamer "Congress" "as is." The schooner "Ludlow" has been sold, through Skinner-Eddy Corporation, Seattle, at $65,000. The steamer "Hornet" is reported sold at $85,000 to steamship people in Louisville, Ky., and the Chilean ship "Guaytecas" has just been reported sold at $32,500, delivery Antofagasta, to New York buyers.

The sailing ship "Katherine" has been chartered for a cargo of nitrate to Honolulu at $16.00 per ton. She then proceeds to Manila to load a cargo of tobacco in bales to Cadiz, Spain, at $45.00 per ton on her dead weight, the charterers, in addition, paying for war risk insurance on the hull. The American ship "E. R. Sterling," which lost a $16.00 charter to Honolulu on account of late arrival at the west coast, has since been chartered again to load nitrate for Honolulu on a $13.00 per ton basis. Hind, Rolph & Co. have chartered a steamer, as yet unnamed, to carry nitrate from Chile to a Gulf of Mexico port at $25.00 per ton. They have also chartered the "John Ena" from Newcastle, Australia, with coal to Honolulu on private terms. This vessel is sailing today from San Francisco with a full cargo of case oil for account of the new owners, the Standard Oil Co., for a New Zealand port.

Lumber freights are also higher. The latest charters for west coast of South America have been on the basis of $32.50 per thousand feet.

For Australia, quite a large business has been done on the basis of 125/- Sydney and 140/- to Melbourne, Adelaide or Port Pirie, at which the market is now quoted firm.

The Petroleum Products Co. have chartered A.

O. Andersen & Co.'s schooner "Else" from Francisco to a usual New Zealand port at 90c per case, the owners having privilege to load a suitable deckload for their account.

No charters have been reported for Africa nor for U. K. or Continent for lumber.

Now that the United States has entered the war combination and it is quite likely in a month or so to commandeer many of our largest steamers, possibly shipyards, and probably all vessels being built at these yards, and in addition, now that the British Government has publicly announced that they are to commandeer all vessels flying the British flag, it seems reasonable to suppose that the Japanese merchant steamers and the comparatively few steamers owned by neutral countries, will be able to get almost any freight they ask, and the rapid advance on time charters (from what they were a month ago, say $8.00 to $9.00 on the deadweight up to $11.00 and $11.50, which has just been paid), is not to be wondered at in this age of surprises, and, of course, entirely due to this world's war.

STATE NAUTICAL SCHOOLS

In keeping with the development of shipbuilding on the Pacific Coast, the states of Washington and California soon will establish nautical schools where young men will be trained to become officers of merchant vessels. Legislative enactment by the Washington legislature in February provided for the establishment of such a school, while the California legislature followed suit on the last of April.

To H. F. Alexander, President of the Pacific Steamship Company, belongs much credit for the establishment of both of these schools; for he spared no effort in bringing to the attention of the public on the Pacific Coast the great need of such institutions. Through the representatives of his company he obtained the endorsement of the chambers of commerce and other organizations of every important city and town in both Washington and California, with the result that the law-making bodies quickly became aware that public sentiment was behind the movement.

By this campaign it was shown conclusively that the interior cities are just as interested in the development of the American merchant marine as are the ocean ports. The most potent argument in behalf of the school appeared in editorials in interior city newspapers such as the Spokane Spokesman-Review and the Sacramento Bee.

"Every citizen of this State has an interest in this measure," an editorial in the Spokesman-Review declared. "It bears upon putting our products into the markets of the world. The farmer is affected, because 90 per cent of our wheat is transported in ships. The development of our maritime commerce and the success of our shipbuilding largely depend upon securing such trained workers as this nautical school would provide."

An editorial in the Bee declared that "the trade of the United States should be carried in American bottoms, manned by Americans and officered by Americans. But that can never be brought about until the American youth has been given opportunity to learn the science of navigation."

So thorough was the campaign of education on the need for these schools that in Washington the House passed the bill uanimously, while only two in the Senate voted against it, and they opposed its form rather than its principle. In California, both houses passed the measure unanimously.

In Washington the Shipmasters' Association and several other public-spirited persons shared with Mr. Alexander in the work of bringing about the establishment of the school. In California, Mr. Alexander's energies were almost entirely responsible for passage of the measure creating a school.

Mr. Alexander was one of the first to see the need of training great numbers of men to officer the many merchant ships that are building and to officer the naval auxiliary forces. With the entry of the United States into the European war, the passage of the bill which was then in the California Legislature became a case of real emergency as an act of national defense, and Secretary of the Navy Daniels sent a telegram to Governor Stephens urging that California establish such a school.

In both Washington and California the school ship idea was endorsed by Governor Lister and Governor Stephens previous to the passage of the bills providing for them.

Secretary Daniels' telegram to Governor Stephens follows:

"The demand for trained officers in the naval auxiliary service and the merchant marine is far greater than the supply. It will be still more pressing with the rapid increase of merchant ships. The establishment of a nautical school on the west coast would be an important contribution to the naval auxiliary and merchant marine service. I hope your State will establish such a school."

Both the Washington and the California bills were framed to take advantage of a federal act whereby the Government will provide half the expense of maintaining the schools up to $25,000 per year. The Navy Department will assign vessels as school ships and also furnish naval officers as instructors. Seattle and San Francisco will be the home ports of the training ships.

Work on the north jetty at the mouth of the Columbia river has been completed, and the work officially declared finished by the government.

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J. S. HINES . . . . Managing Owner
F. M. DICKIE . . . . Editor
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WOODEN SHIPS

A great deal has been said and written anent the programme of the Shipping Board in its reference to wooden ship building. The fanciful terms of "1000 wooden ships of about 3000 tons deadweight each" have been given great publicity in the daily press and have been subject to more or less criticism in the technical and semi-technical magazines.

There are several points concerning wooden vessels which it is well to remember. The building of wooden ships is in no sense to be considered as a displacement of steel tonnage. One thousand ships of 3000 tons deadweight each amounts to 3,000,000 tons of shipping, and Great Britain, with some 453 shipbuilding plants, has never exceeded 2,000,000 tons very much as an annual output; surely, then, the original programme of the Shipping Board was an ambitious one.

The difference in cost between wooden and steel ships is still very great, but this difference will rapidly dwindle, even with the strictest government supervision of the yards. Any large number of wooden ships will have to be built by house and mill carpenters and ordinary labor, with perhaps a thin sprinkling of ship carpenters acting as leading men. The wooden ship, in the very nature of things, takes longer to build than the steel hull, the advantages of organization and standardization will be largely counteracted by the inefficiency of a large portion of the labor employed, and finally the conditions surrounding the necessity for speed —three shifts a day, etc.—will cause a marked raise in the cost of doing work in our wooden shipyards.

All this, of course, has no bearing on the wisdom of building a large fleet of wooden vessels to counter the heavy inroads of German submarines on the merchant fleets of the world. The mobilization of our shipbuilding resources is a necessity, and it is highly expedient that the wooden shipbuilders as well as the steel yards be brought to as high a state of productive efficiency as possible.

There is a grave danger, however, in allowing the general public to be impressed by the idea that a fleet of wooden ships can be produced over night. If this opinion is allowed to prevail, the failure of the wooden fleet to materialize as rapidly as the public expects will result in a storm of totally undeserved and unfair criticism directed at the Shipping Board and the sub-committees working under it. By all means, let us have every wooden shipbuilder in the United States build as many wooden ships as he can and as fast as he can; but let us also have sensible ideas in regard to the number of these vessels that can be built and the time necessary to turn them out.

OVERDOING THE WOODEN SHIP?

In these days and times one can hardly pick up a daily paper in any of our Pacific Coast seaports without reading of the formation of a new shipbuilding company. The originators of these concerns are often shipbuilders or have some connection with shipbuilders of knowledge and standing, and on the other hand we find groups of men in every walk of life starting in on the wooden shipbuilding game. The wooden shipbuilding programme of the United States Government has greatly added to the public's impression that wooden shipbuilding is a fine business venture, and a study of the State Department records of our three Pacific Coast States will disclose the fact that there are close to one hundred companies incorporated to engage in the highly laudable business of increasing our merchant marine tonnage.

Owing to strict state supervision, there will be little if any loss to investors in those stock concerns which fail to make a final start at building ships, but grave dangers lie in the path of concerns headed by men who are totally inexperienced in shipbuilding and who are contemplating government work on a cost and percentage basis.

It must be remembered that there will be a demand for rapid construction on the part of the government, and to secure this the location of the shipbuilding plant must be adjacent to rail as well as water transportation, there must be sufficient depth for launchings, building slips and their foundations must be put in, and a reasonable overhead handling equipment.

That the shipbuilding plant must be near a reliable source of labor goes without saying, and perhaps the supply of labor will prove the stumbling-block for many of the new yards that are about to start. Sufficient ship carpenters are entirely out of the question, and house carpenters, mill carpenters and even ordinary labor will have to be broken in.

To build and equip a plant solely with the purpose of handling government work on a cost and ten per cent basis is rather a dubious undertaking. It is not altogether clear in the minds of many just what the term "ten per cent profit" means. The Government is going to build ships, not shipbuilding plants. While it may be found necessary to give financial aid to some existing wooden plants in order to help cover the cost of putting in a large number of building slips that might never be occupied after the present crisis is over, it is practically certain that the Government will not pay for the installation of new shipbuilding plants. If $100,000 is spent in securing a shipbuilding site and laying out a yard with a number of building slips, this outlay will not be returned until $1,000,000 worth of government construction has been completed and delivered. The investors, provided no dividends had been paid, would, of course, have a shipyard paid for and free of debt, but that yard, should the government demand for wooden ships cease, would not be worth anything like the cost of installing the plant. The yard might have six building-ways and never again have occasion to use more than two of them. The amount of commercial work required would be very slender and the competition for it very keen, and, furthermore, the older yards with established business connections would, generally speaking, receive the preference.

It is quite evident, therefore, that the business of wooden ship building should not be entered in a haphazard manner, as there is grave danger of overreaching the demand and creating a dangerous condition for the industry after the present abnormal demand ceases.

STATE LAWS AFFECT INTERSTATE RATES

Renewed attempts by the legislatures of the various States to enact additional legislation further increasing operating expenses of the railroads, such as "full" crew laws, will no doubt serve to direct the attention of the federal government to the fact that, inasmuch as it increases cost of operation, such state legislation has a direct relationship and a direct bearing on interstate rates and commerce.

The so-called "full" crew laws enacted by the various States for no other purpose than to create more jobs, coupled with other needless state legislation, have increased operating expenses in an enormous amount. Even in the face of this, bills were introduced at the recent session of the legislatures of the various States amending existing laws and making them more burdensome.

In Oregon and Utah among the bills introduced were bills limiting the number of freight cars in a train—measures which struck at the very vitals of the carriers and would if enacted have seriously crippled both state and interstate service.

In Nevada bills were introduced requiring "standard" cabooses on all freight trains, requiring telegraph and telephone offices in towns of over 1000 population to be kept open day and night, and requiring the posting of notices on bulletin boards at all stations concerning all passenger trains over one hour late on schedule.

In California, where the Legislature is still in session, and where, as in most States having so-called "full" crew laws, trains are already overmanned, among the bills introduced is one requiring an additional flagman on all trains "that load or unload freight or pick up or set out cars at two or more stations en route," regardless of the fact that these trains already have a competent flagman, and requiring an additional man on gasoline cars and electric locomotives.

As approximately 225,000 trains carrying freight are run on the railroads in California during a year, this bill would compel the railroads either to place an additional and entirely useless man on practically all freight trains at an increased annual expense of about $500,000, or to deprive the public of much accommodating service by discontinuing the present practice of picking up important carload freight by through fast trains and confine the work of picking up and setting out cars and unloading freight to local trains as far as possible.

In the past the federal government has paid little or no attention to the effect or relationship of so-called "full" crew laws and other needless State legislation on or to interestate rates, but now that the railroads have been compelled by accumulating burdens to appeal to the Government for an increase in interstate rates, it is altogether probable that Congress will more easily and fully appreciate the economic importance of exclusive federal control of such utilities.

The first week in April witnessed an unusual gathering of trans-Pacific ship line heads in San Francisco. John H. Rosseter, Vice-President and General manager of the Pacific Mail; W. H. Avery, Assistant General Manager of the Toyo Kisen Kaisha, and C. D. Benjamin, General Passenger Traffic Manager of the Canadian Pacific steamship lines, all arrived in San Francisco within a few days of each other and all are just finishing extended tours of inspection and study in the Orient.

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Collision Liabilities

ACCORDING to a recent issue of "Fairplay" (London), a question interesting alike to shipowners and underwriters regarding liability of a colliding vessel for damages not repaired prior to the total loss of the injured vessel is now being discussed. The question put is this: The steamship A collides with the steamship B and severely damages her, and A admits liability for the whole damage. B makes temporary repairs and then proceeds for another port, where permanent repairs are to be made, but before arrival is sunk by a mine and totally lost. Must A pay the entire amount which it would cost to repair the damage or only the cost of temporary repairs which were actually made and paid for?

In the article it is stated that in a reference in the Admiralty Division a French shipowner was given the whole amount that would have been spent on the repairs, notwithstanding that the ship was lost in proceeding to her repairing port and the sum was never expended. And it is stated that one of the arguments which weighed was that in the case of leasehold property the ground landlord can claim for dilapidations, and immediately after he has received the full amount he can pull the premises down and not spend anything, his intention being to destroy the property all of the time. In the case on trial it was held in effect that the liability had been incurred, and the wrongdoer should not go free by reason of the misfortune which had happened to the other vessel. And it is also stated that in one case the owners are claiming not only for the cost of the repairs, but damages for the time that would have been required to make the repairs, and that while the opinion among lawyers is that the claim will be recovered in full, yet some well known laymen hesitate to endorse counsel's views.

I must confess that I rather range with the other laymen. The case of the leaseholder may be somewhat analagous, but is it exactly in point? The leaseholder pays a certain rental for occupancy and use, and in addition agrees to pay for certain damages that may accrue. This is, in effect, an additional price for the use of the property. The lessor and lessee might agree at the time of signing the lease that a certain additional amount was to be paid, either monthly or in a lump sum, at some time during the life of the lease, for damage in excess of ordinary wear and tear, in which event the transaction would become more or less of a hazard; for such damage might be small or great, but the sum would be fixed and payable. And further, the owner might have changed his intentions at the last minute and instead of destroying the property have decided to again lease or to occupy the property himself, in which event there would be clearly no bar to his right of recovery, for the intention of the clause in the lease was to compel the lessee to repair any extraordinary damage occurring through his use or neglect, to save the owner from any loss that might be occasioned by reason of the damage. The clause is not strictly a punitive one, for if it were so intended the penalty would extend to include a sum greater than that required to make the repairs. Had the building become a total loss by fire the day or the day after the lease expired, what loss would the owner have suffered by reason of the extraordinary damage to the property during the tenancy of the lessee? And why should the lessee pay to the owner a sum of money to repair that which obviously neither he nor the owner could repair? Such a payment would be in the way of a penalty not contemplated.

So in the case of a vessel under time charter to be delivered back to the owners at a certain port and at about a certain time, with an obligation on the part of the charterer to repair any extraordinary damage that may have been done through use or misuse during the life of the charter. At her last port of discharge certain damages are discovered for the repair of which the charterer admits liability, but without these repairs being made

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she is started for the port of delivery to her owners, and while en route she is totally lost. Is the charterer liable to the owner for a sum of money which it is estimated these repairs would cost could they be made? This charter party liability is not punitive in any way other than to see that the owner is not put to loss through the misuse of the property by the charterer, and as the vessel has become a total loss through no fault of the charterer before the owner has taken delivery, and before he has suffered any loss through the misuse, it is rather difficult to see how there can be any liability on the part of the charterer.

In all cases of collision the liability of the wrongdoer is limited to the actual loss to the injured party, in the way of repairing the physical damage to the ship and for loss of time (earnings) during the time the vessel is out of commission for the repair of the damages. There is no additional penalty, either monetary or otherwise, inflicted as a punishment for his misdeeds. B, in seeking to recover from A for the estimated cost of unrepaired damage, damage caused by the collision, and also for loss of time, is seeking to inflict on A a monetary punishment for her misdeeds; for B having been sunk through no fault of A's, the owners are not out of pocket as a result of the collision beyond the cost of the temporary repairs. If the owners of B are to contend that but for the collision and the consequent delay B would not have been in the position she was when destroyed by the mine, and therefore would not probably have been destroyed, then it would seem that B's claim should be for the entire value of the steamer; for if that contention should hold good, then the loss to the owners of B as a result of the collision would be measured by the value of the steamer and not by the cost of repairing damage previously sustained, and loss of time on account of making these repairs. But in similar contentions in other circumstances, the courts have held that such a loss was too remote from the alleged cause and it is not likely that this contention, if made, will be considered.

The case in question involves many thousands of dollars, and when it reaches the courts there will be many legal minds to study all points and to put forward many convincing arguments for both sides. There will probably be a lengthy decision with dissenting opinions and also probably an appeal to the House of Lords, and the outcome will be looked forward to by both owners and underwriters. A can say to the owners of B, "I admit that I ran into your steamer and that I was the cause of some damage to her. I am quite willing to pay for the repairs made necessary by my wrongdoing, and also to reimburse you for any loss of time you may suffer through my negligence, but before I pay, you must bring in the victim and prove the damages." The issue will probably turn on that question, can the owners of B prove any damages without first bringing in the subject matter and thus establish the damage?

A TICKLISH QUESTION

NOW that the United States has definitely and actively entered into the European war, our admiralty courts will undoubtedly have submitted to them for decision many of the same problems that have been submitted to the British courts, and one of the many perplexing things to decide will be as to the liability between underwriters against marine risks only and underwriters against war risks in the case of a "missing" vessel.

One such case was recently considered in England concerning a steamer which sailed from a port in Scotland for a destination not far distant and which never was heard from. The steamer was under requisition of the government, and the Director of Transports held that as there was no evidence of submarines having been seen in the vicinity and that no mines had been reported in that locality, the loss must be considered as being due to perils of the seas only. On this holding, some of the underwriters against marine risks only paid a total loss, but others refused to pay a total loss and also refused to consider a 50 per cent settlement.

There is much to be said for those underwriters for refusing to pay a total loss, for even if no submarines or mines had been reported, yet they might have been there, or the steamer might have been destroyed by a bomb concealed inside by an enemy subject. So far as the actual cause of the loss is concerned, the opinion of one man, whether he be a director of transports, a judge, a lawyer, an underwriter or a layman, is just as good as that of any other.

Take the case of a steamer sailing from an Atlantic United States port for a British or French port and which is never heard from, who can say what nature of accident caused her destruction? At this writing there are reports of enemy submarines having been seen in mid-Atlantic, and there is little doubt but that submarines will attempt what they have already accomplished and take toll of ships near our Atlantic seaboard, and will scatter mines where they may be considered to do the most harm. Further than this, explosives might be placed aboard by some of the innumerable spies which infest this country. All of this would tend to indicate the probability of the loss occurring through a war risk.

On the other hand, heavy gales might be reported in the path which the missing vessel might be supposed to have taken and which would lend color to the supposition that she had been lost by a peril of the sea. There can, of necessity, be no direct evidence. Who can say what was the real cause of the loss, and will underwriters accept the verdict of any one man, or set of men, when they have the undisputed right to their own opinion?

In the British case referred to, the full details are not to hand, but for the honor of the profession it must be supposed that those marine underwriters who have refused to settle on a 50 per cent basis have fairly good grounds for their refusal. Marine underwriters, as a rule, are not ultra-technical and are willing to meet a bona fide claimant more than half way, and a bare statement of this kind calls for a suspension of judgment until both sides of the question can be heard. There may be other conditions which would technically relieve both sets of underwriters of any liability under the policies, but aside from this it is not business equity to leave an assured, who has covered himself against loss from all anticipated perils, to flounder between two stools without having the support of either. He has paid two premiums to protect himself, and he should see to it that his policies provide protection when his insured property does not arrive, and the cause of the loss, whether by a peril of the sea or a peril of war, cannot definitely be ascertained.

It is also incumbent on the underwriter to see that the protection paid for is fully assured. If the direct cause of the loss cannot be ascertained to amount to proof, then there should be a division of liability and the policies should so provide and this should be done voluntarily. This market has recently been flooded with orders for war-risk insurance on the Atlantic, but many underwriters seem inclined to go slow, not because they are unwilling to accept the hazard at the going rates, but they feel that some agreement should be reached and expressed between the different sets of underwriters as to the respective liability in the case of a "missing" vessel. A refusal to pay in full or to split the loss is repugnant and discredits the entire profession.

LARGE FORGING CONCERN

The shipbuilding interests on the Pacific Coast will be glad to know of the construction of a shop, designed and equipped to care for the needs of the shipbuilder.

The Camden Forge Company, Camden, N. J., U. S. A., have under construction an addition to their present shops, a new building 100x400 feet to be equipped with presses and machine tools capable of manufacturing the forgings for heavy cargo boats.

This forge has been in operation for fifteen years, but not until recently has its product made its appearance on the Pacific Coast. The experience this company has had in the past, in making marine forgings become invaluable, and the filling of their new shop with orders is a matter of course.

Recently so many of the shipbuilding fraternity of the Atlantic, who directly knew, or at least knew of the Camden Forge Company, have joined the ranks of our Pacific brethern, that this forge felt it desirable to appoint a Pacific Coast representative in order that one near at hand might promptly act when prompt action is required, so that A. A. Hilton Co., Seattle, Wash., have been appointed representatives of this company on the Pacific Coast.

San Francisco

The California Transportation Company moved into new quarters on the Washington street pier and will remain in this location until the completion of the steel and concrete pier at the foot of Jackson street, which will be constructed specially for handling river traffic and which will be occupied permanently by the California Transportation Company.

The two 55,000-barrel oil tanks installed by the Matson Navigation Company near Crockett are now in use. These tanks were erected to save steamer time, the Matson boats now taking on oil fuel at the same time they are discharging their sugar cargo for the Crockett refinery.

A COMBINED STEAM TURBINE AND CENTRIFUGAL BOILER FEED PUMP

The displacement of the reciprocating boiler feed pump by the centrifugal pump furnishes a good example of the necessity resting upon manufacturers of machinery for sustained technical development. The duplex, boiler feeder, considered an improvement at the time of its introduction some 50 years ago because of its simplicity and more uniform delivery, was eventually taken up by numerous manufacturers, each of whom developed a complete line. The type became standardized, so that competition was close and severe. A comparison of the closely printed tabulations of sizes and models of duplex pumps, as catalogued by the dozen or so builders, will indicate the immense amount of money that was invested in drawings, patterns and manufacturing equipment, all now rendered practically obsolete, or at least greatly depreciated in value, by the perfection of the more compact, simple, reliable and efficient steam turbine-driven centrifugal boiler feeder.

Since it must handle a comparatively small amount of water against a relatively great head, the centrifugal boiler feeder should be fitted with small diameter impellers running at high speed. It is therefore well adapted for steam turbine drive. Fig. 487 shows an early steam-turbine-driven boiler feeder built in 1910 by the De Laval Steam Turbine Co. The two-stage pump has a capacity of 1600 gal. per minute against 700 ft. head at 2800 r.p.m., and upon test gave an efficiency of 60%. The pump is entirely independent of the turbine, a coupling being interposed between the pump shaft and the turbine shaft, and it could therefore have been driven just as well by electric motor or by rope or belt as by a steam turbine. The unit, however, realized the advantages peculiar to the centrifugal boiler feeder, viz., reliable and uninterrupted service with little, and often unskilled attention, absence of pulsation, shock, water hammer, vibration or over pressure in pipe lines, elimination of relief valves, suitability for use with automatic boiler feed regulators acting independently at each boiler and with feed water meters, close governing, either by speed governors or by pressure governors, freedom from injury by overloading, lightness and compactness, accessibility, elimination of valves, packings, sliding surfaces and air chambers, small upkeep and attendance expense due to simplicity and few wearing parts, lower cost of maintenance of piping system, small consumption of oil, efficiency, and in the turbine-driven type, ability to use superheated steam or to run upon either high or low pressure steam, oil-free exhaust and independence of the main units.

A still further development in the direction of compactness and simplicity is shown by the accompanying photographs Nos. 1092 and 1093, illustrating a 3,000 h.p. two-stage, centrifugal boiler feeder combined in one casing and on one shaft with a velocity-stage steam turbine. This unit, which also has been developed by the De Laval Steam Turbine Co., weighs only about one-tenth as much as a duplex reciprocating pump of the same delivery and occupies only about one-eighth as much floor space and one-fifteenth as much cubical space.

The pump end contains two single-suction impellers cast from a special bronze and carefully finished to exact contours. Two impellers are used for pressures up to 200 lb. per sq. in. and three impellers for higher pressures. Single-stage boiler feed pumps have been built, but two or three stages are preferable because of the much longer life of the impellers at slower speeds. Each impeller discharges into a volute chamber by means of which the velocity in the water as it leaves the impeller is converted into pressure before the water is led to the eye of the succeeding impeller. This means of energy conversion is superior to the use of diffusion rings as it is efficient over a wider range of delivery, and more important still, does not involve the use of small and sharp parts like diffusion blades, which are subject to rapid erosion.

The pump is hydraulically balanced and only one pair of labyrinth rings, surrounding the suction opening is required for each impeller except the last, which has two sets of rings. The whole back of the impeller is subjected to a pressure equal to that existing at the periphery of the impeller, the same pressure acting on the front of the impeller, except for the area of the circle enclosed by the labyrinth ring about the suction opening. The last impeller, that is the one from which the water is finally discharged, is equipped with two sets of wearing rings, one on the suction side and one on the reverse side of the web. As some water from the discharge of this impeller will leak between the wearing rings into the space back of the web, this impeller would be equally as unbalanced as the other impellers in the pump if there were no escape for the leakage water. To provide for diminishing the pressure in this balancing space as much as may be required to bring the whole series of impellers into balance, a leakage outlet is provided from which water can be conducted back to the suction of the first impeller.

The outlet leakage takes place between two collars, one attached to the casing and the other carried on the shaft. When the shaft moves towards the discharge end of the pump this escape is closed off and the pressure builds up in the balancing chamber. If the shaft, on the other hand, moves toward the suction, this escape passage is opened wider, allowing the pressure in the balancing chamber to fall and at the same time the inleakage between the labyrinth wearing rings is decreased. By this means direct and positive balancing within every close clearance is secured with the leakage of but a small amount of water. The so-called natural balancing secured by the use of double-suction impellers in a multi-stage pump is in comparison uncertain and imperfect, besides involving an extra long shaft, heavier impellers and two pairs of wearing rings to each impeller.

The labyrinth wearing rings are readily renewable, the stationary ring of each pair being held in a seat in the casing and the rotating ring being screwed upon the impeller. The reduction of leakage secured by the use of intermeshing labyrinth rings is highly important for securing high efficiency in pumps of comparatively small delivery. With the labyrinth type of ring the leakage path is so tortuous that very little water escapes even at high heads, although ample clearance is provided to take up expansion and contraction due to changes in temperature.

The suction end of the pump is adjacent the turbine and the shaft packing between the turbine and pump chambers is hence subjected to turbine exhaust pressure on one side and the suction pressure on the other. A simple packing is therefore sufficient, and in any case, any small leakage of steam in one direction or of water in the other does no harm. As the leakage space adjacent the balancing chamber at the discharge end of the pump is connected back to the pump suction, the packing about the shaft is subjected only to suction pressure. Aside from the intermediate packing already mentioned, there is only one steam packing, which is subjected to exhaust pressure.

The steam end of the unit consists of a velocity-staged turbine with either two or three rows of moving buckets ,according to the steam economy desired. The nozzles can be proportioned for either high pressure steam exhausting to feed heater or to condenser or for low pressure steam exhausting to condenser, or the unit can be made interchangeable, thus permitting of a great degree of flexibility in plant design. Where the exhaust steam from the boiler feeder is consumed in heating feed water, the thermal efficiency of the turbine-driven boiler feeder is much greater than that of a boiler feeder driven by electric motor, or even than that of the main unit itself.

The unit is ordinarily fitted with a speed governor mounted upon the end of the shaft and when running at constant speed, the head varies with the delivery, as shown by the curved characteristic in the accompanying chart. As will be seen, the rise in pressure at reduced capacity is not excessive. Ordinarily, however, a pump governor controlled by the pressure at some point in the feed line near the boilers is employed to control the speed, giving a practically uniform pressure at all deliveries, as shown by the lower and straight line in the chart. In case of failure of the pressure governor to operate, the control of the unit is automatically taken over by the speed governor.

However, to provide against any possibility of racing, an emergency governor is also fitted. This consists of a pin contained within a hole bored diametrically through the shaft. This pin is held by a spring from flying out under the influence of centrifugal force. When the speed reaches a certain point, the spring is compressed so that the pin strikes a trip, releasing another spring by which the governor valve is closed at once and completely. Racing and excessive over pressure are therefore impossible. The normal speeds of these pumps vary from 1800 to 3500 r.p.m., according to pressure and capacity, and due to the heavy shafts employed are far below the critical speeds.

The bearings are of the straight, ring-oiled type, and, like other parts subject to wear, such as the pump impellers, turbine rotor labyrinth rings and governor valves, are built to a limit-gage basis, so that they are all interchangeable. The entire rotating members and all wearing parts, with the exception of the governor valve, are accessible for inspection or removal upon lifting the casing cover and taking off the bearing caps, all of which can be done without breaking steam or water pipe connections.

In specifying the capacity of boiler feeders, the temperature of the water to be pumped should always be stated, as the capacity is nearly 50% greater with water at 75° F. than with water at 210° F. For the same reason capacity and efficiency tests of a pump should be carried out with water at the temperature at which it will be received by the pump when in actual service. The De Laval Steam Turbine Co. announces that it is equipped to make such tests on the pumps which it builds.

REVIEWS

Practical Marine Engineering. Fourth Edition. Revised and Enlarged by Captain C. W. Dyson, U. S. N. Size 6 by 9 inches. Pages 982. Illustrations 550. Marine Engineering, New York, Publishers. Price, $6.

The first edition of this book, published in 1901, was written by Professor W. F. Durand, at that time head of the Department of Naval Architecture and Marine Engineering at Cornell University and at the present time head of the Mechanical Engineering College at Stanford University. The book ran through three editions with slight changes and additions, but the latest edition has been thoroughly revised and entirely rewritten by Captain C. W. Dyson of the Bureau of Steam Engineering, U. S. N., one of the foremost authorities on marine propulsion in the United States and recognized as the court of last resort in propeller design the world over.

Much new material has been added by Mr. Dyson in order to bring the book thoroughly up to date, although the recent advances in marine engineering have been so rapid that it has been found necessary to make the descriptions of new machinery as short as possible. The new matter deals with steam turbines, improved water-tube boilers, fuel oil burning, superheated steam, oil engines and a great number of auxiliaries which have recently been perfected.

The original purpose of the book to provide help and instruction for the student just entering his engineering career as well as for the seasoned veteran has been strictly adhered to. Practical engineering set forth in a practical manner has been the object of Mr. Dyson as it was with Professor Durand in the earlier editions. Construction, operation, management and repair of machinery is dwelt more upon than the niceties of design.

Materials of engineering construction and fuels are first taken up; followed by the latest types of marine boilers, together with superheaters and accessories. The chapter on oil fuel burning is practically new and not only described the latest types of fuel-oil burners, but also the methods of operating an oil fired boiler.

Steam turbines and internal-combustion engines of both the explosive and Diesel types are described in detail.

In the chapter on operation, management and repair, which is of special interest to the practical marine engineer, much valuable information is given regarding the operation of turbine propelled vessels. The subject of steam engine indicators has been amplified by a section on torsion meters for determining the horse power of turbines.

The book contains a collection of miscellaneous problems and discussions, many of which will be of value to the professional engineer in connection with the various questions likely to arise in his experience. At the end of each chapter are questions, with a page reference to the part of the book where the answer to each question may be found. It is believed that the subject matter thus presented will be extremely useful to an applicant for a marine engineer's license, as the matter on which such examinations are based is covered thoroughly. The mechanical make up of the book leaves nothing to be desired.

Frank Waterhouse & Company's Pacific Ports, Third Edition. (Edited by Welford Beaton.) Terminal Publishing Co., Seattle, 400 pages; $3 net.

At a time when the attention of America is occupied so largely with foreign trade "Pacific Ports" is a valuable addition to commercial literature and an examination of the volume suggests the thought that any house that is doing business with our own Pacific Coast or any of the countries or the islands of the Pacific cannot very well afford to be without it. It is a commercial geography, a commercial dictionary, transportation guide and marine manual in one volume, attractively bound in limp leather and most carefully compiled for ready reference.

Starting with Alaska on the north, its geographical section follows the west coasts of Canada, the United States, Central and South America, embraces the islands, large and small, of the Pacific, and follows the east coast of Asia to Siberia. A description of each country and island is given; the customs regulations to be followed by exporters and importers, facsimiles of the consular documents required for each and detailed information about each harbor are included.

In the commercial section are given the sources of supply of the world's commodities and a dictionary which gives the names, sources of origin and uses of everything that enters into commerce.

The United States customs and other regulations are interpreted for the hurried business man who has no time to go through the involved pages of innumerable government documents to find out what "draw back" means or how many attendants he must provide for a shipment of horses to a foreign port.

The section devoted to tables is unusually complete. The monies of all the countries on the Pacific are reduced to their American equivalents as are the weights and measures. The only table in existence that gives at a glance the freight on a given number of tons charged for on a measurement basis is in the book. The distance tables are arranged so that it is easy to ascertain the number of miles between two even unimportant points on the Pacific, while the distances between the leading ports and the other important ones of the world are given in detail.

The transportation section is the only complete primer devoted exclusively to Pacific shipping published. The mariner who sails that ocean will find it of value and for the shippers of goods to any point on the Pacific Ocean it will be indispensable. The traffic official who has this volume at hand will be able to answer any question about our western trade.

L. W. Ferdinand and Company of Boston, manufacturers of Jeffery's marine glue, have issued the following information in reference to their No. 2 Jeffery's Black Marine Ship Glue. While this glue is a little higher in price than No. 3 glue, it is about 15% greater in volume, being of a lower specific gravity. The volume being 15 per cent greater and the price only 12½ per cent greater the cost of paying seams is about the same with either article. The difference in quality between the two is quite marked. The No. 2 melts up and pours freely and is more elastic and clean and free from sediment.

"Mobilizing America." The Macmillan Company, New York; 129 pages; 50 cents net.

This little book is a digest of voluminous notes prepared by Arthur Bullard and intended for publication later in a much more voluminous volume. The entrance of the United States into the war, however, made it imperative that the useful knowledge embodied in this little book be made public.

"Compressed Air for the Metal Worker." First Edition. By Charles A. Hirschberg; 320 pages; 300 illustrations. The Clark Book Company, Inc., New York.

This book should prove welcome to countless engineers since it covers a field in which literature is none too plentiful. The work is divided into seventeen divisions as follows: Historical, the compressed air power plant, compressor details, compressor accessories, installation and care of compressors accessories and pipe lines, portable pneumatic tools, care and operation of pneumatic tools, compressed air uses in the power plant, compressed air in the foundry, sand blasting, compressed air uses in the machine shop, compressed air uses in the forge shop, compressed air uses in boiler shops and structural steel plants, hoisting, handling, conveying, cleaning with compressed air, the application of paint, enamel, lacquer, metal coating, etc., by compressed air and pumping with compressed air.

"Steam Turmines," by William J. Goudie, B. Sc., Member of the Institution of Mechanical Engineers, Member of the Institute of Engineers and Shipbuilders of Scotland, Reader in "Theory and Practice of Heat Engines," University of London; 511 pages; 230 plans and illustrations. Longmans, Green and Co., Fourth avenue and 30th street, New York; $4.00 net.

This book has been prepared primarily to suit the requirements of the engineering student, but the methods of calculation outlined will be found highly useful to the designing or operating engineer. The first portion of the volume is descriptive of the various commercial types of turbines now on the market and gives a clear insight into the variations of design which mark the different makes of machine. Following this is the technical part of the book. As far as it is possible to apply measuring coefficients and data, this has been done, the necessity of a turbine's meeting individual conditions always being kept in sight. A large number of examples in which problems of a practical character are taken as a base are introduced and this feature of the book is extremely valuable. In every respect the book is a most worthy addition to the existing literature on the steam turbine and the author has displayed excellent judgment in restricting the scope of the volume to the turbine itself, leaving the condenser, pumps, etc., to be dealt with in other volumes or by other writers.

"WARSHIPS," by E. L. Attwood, R.C.N.C., M. Inst. N. A.; 358 pp., 225 illustrations and diagrams. Longmans, Green & Co., Fourth Ave. and Thirtieth St., New York. $4.00 net.

This is one of the clearest, most concise and simple works on the subject of warship construction that we have seen in print. At this time "Warships" should prove of great interest to a wide circle of readers. While written primarily as a text-book, the language and arrangement are such that the layman will receive a clear insight into a subject that is bound to be of great interest at this time. The book is in its sixth edition, the rapid changes in naval design of recent years as well as the demand for the book making new editions imperative from time to time.

American Steam Gauge and Valve Manufacturing Company.

Illustrated catalog No. 65 is a well arranged review of the extensive lines of gauges, valves, indicators, traps and kindred appliances manufactured by this firm for the purpose of governing, indicating, measuring, recording and controlling steam, air, water, gas, oil and ammonia. The catalog is handy in size, complete in contents and well indexed. The general office of this company is located at 208-220 Camden street, Boston, Mass.

The Independent Pneumatic Tool Company.

The Independent Pneumatic Tool Company of New York and Chicago have issued catalog No. 10, a well-designed piece of printing and cut work descriptive of reversible and non-reversible piston air drills, portable grinding machines, close-quarter drills, turbine drills, pneumatic hammers of all patterns, self-supporting hammers for driving stay bolts, pneumatic sand rammers, air hoists, holders-on, flue expanders, pneumatic hose, hose couplings, electric drills and grinders. The western offices of this concern are located at 61 Fremont street, San Francisco; 209 First avenue South, Seattle, and at 409 East Third street, Los Angeles.

NEW POWELL CIRCULAR

The Wm. Powell Company of Cincinnati, Ohio, makers of high class engineering specialties, have issued an attractive circular in colors describing the Powell "White Star" valve.

The body shell of this valve is cast of the best gun metal composition, also the trimmings excepting the disc, which is cast of "Powellium" white bronze with a melting point of 2000 degrees Fahrenheit. The discs are regrindable, reversible and renewable. The disc can be reground to a bearing without the use of a regrinding machine. The guides in the body neck always keep the disc in a vertical position. The patent bevel ground joint connection between body and bonnet neck secured by a hexagon union swivel nut insures an absolute steam tight joint under all pressures. The stems are packed with a drive gland in stuffing box with plenty of room for packing. Cast of special metal and machined with an Acme thread, which is admitted the best for severe use. The non-heating iron hand wheel, enameled white, with projecting knobs, allows you to get a firm, cool grip even though your hands may be oily.

We have received a copy of that most useful and handy little volume of 48 pages, Booklet 272, "Roster of the Sixty-fifth Congress of the United States," published by The American Protective Tariff League, New York, and mailed with the compliments of the League to all of its connections. The Roster is a convenience which should be on every man's desk. It contains a full list of the Senators and Representatives of the Sixty-fifth Congress and the Congressional tariff committees. The large number of letters from Congressmen and business men expressing unabated interest in Protection as the right American policy in peace or in war are very interesting.

DEAN BROTHERS' CIRCULAR

The Dean Brothers Steam Pump Works, of Indianapolis, Indiana, have issued their Circular 104, in which is presented the principal advantages derived from the careful planning and construction of the vital features of Dean Brothers' "Durable" duplex pump. This pump has been developed on an entirely new design, and the circular has been issued as a guide to the most important features to consider when selecting a pump.

In our February number we published a version of the "Dreadnought" song, inviting criticisms or corrections, and among the replies received is one from Capt. William S. Samuels, of Wm. S. Samuels & Son, of Philadelphia, a son of the Captain Samuels who commanded the "Dreadnought." Mr. Samuels' communication sets forth the song as follows:

'Tis of a flash packet a packet of fame
She is bound to New York and the "Dreadnought" 's her name
She is bound to the westward where the stormy winds blow,
Bound away in the "Dreadnought" to the westward we'll go.

Now we are hauling out Waterloo dock,
Where the boys and the girls on the pierhead do flock;
They give us three cheers, while the tears down do flow,
Bound away in the "Dreadnought" to the Westward we'll go.

Now we are laying in the Mersey all day
Awaiting for the "Constitution" to tow us away,
All around the Black Rock where the dark Mersey flows
Bound away in the "Dreadnought" to the Westward we'll go.

Now we are bowling down the wild Irish sea
While the passengers below they are drinking so free
And the sailors aloft like larks to and fro
Wishing luck to the "Dreadnought" wherever she go.

Now we are crossing the ocean so wide,
Where the white and blue billows dash against our black side,
With our sails spread so neatly the red cross we'll show,
Bound away in the "Dreadnought" to the Westward we'll go.

Now we are crossing the banks of Newfoundland,
Where the waters are green and the bottom's all sand,
Where the fish in the ocean swim around to and fro,
Wishing luck to the "Dreadnought" wherever she go.

Now we are hauling down Long Island shore,
Where the pilot boards us as he's oft done before;
Fill away your fore-topsail, board your main tack also!
She's a Liverpool packet—Lord God let her go!

Now we are anchored in New York once more,
I'll go and see Sally, she's the girl I adore.
You may talk of your packets, "Swallow Tail" and "Black Ball",
But the "Dreadnought" 's a clipper and she licks them all.

Here's health to the "Dreadnought," her officers and crew,
Here's health to Captain Samuels where'er he may go,
Here's health to us all when the stormy winds blow,
And this song was composed in the dog watch below.

Captain Samuels writes: "This is a copy of the original song, which I had for many years, but now is lost. I was on board at the time with my father, the late Captain S. Samuels, and the song was composed and sung for the first time to my mother on July 4, 1858, on the voyage from Liverpool to New York."

Mr. George E. Lawrence, Philadelphia representative of the Eckliff Circulator Co., of Detroit, has been commissioned a First Lieutenant in the U. S. N. R. F., and is now in active service somewhere along the Atlantic. Mr. Robert Bellows, of Fleeton, Va., another Eastern agent of the Eckliff company, is also serving in the U. S. N. R. F., with commission of Warrant Machinist. Both of these men are well qualified for the important duties to which they have been assigned, and will prove valuable aids to Uncle Sam.

LOW VISIBILITY PAINTS

It will be remembered that the report on the Battle of Jutland contained a remark about the "low visibility" of the German vessels.

During the last twenty years, the German Navy has made a study of painting their vessels with a color which should be as difficult to discern on the distant horizon as ever possible. The color so arrived at is a sort of dirty grey.

A similar grey color has also been adopted for the upper works of the United States, British, French and Italian Navies. Commercial ships, however, have not taken advantage of this fact to hide themselves as far as may be possible from submarines. Why they should have neglected to take advantage of protecting themselves from attack in this way is difficult to understand.

It has, therefore, remained for enterprising paint manufacturers to call the attention of their clients to the advantage of using a paint so constituted as to give the greatest possible invisibility to vessels, and we may say it would be desirable to apply this paint not only to the topsides, but also to all the upper structure of ships, such as deck-houses, hatches, etc., so that the sun's rays may not be reflected by any of the brighter colors, and divulge the presence of the vessel to submarines or raiders.

Holzapfels American Compositions Co. are calling the attention of their customers to their **"Low Visibility" Grey Paint** for topsides and upper works of ships, and they can supply this at short notice in the most desirable color. This paint dries quickly, has excellent lasting powers, and is easy and economical of application.

It is to be hoped that shipowners will avail themselves of every possible protection to avoid the destruction of their valuable property, and there is no doubt but that the use of such a paint may be a considerable safeguard against detection by enemy vessels from a distance.

Eckliff Circulators are well represented in ships of the United States Government now under war orders. Several of the larger Scotch-boilered ships of the U. S. Navy and the War Department are Eckliff-equipped—also boats of the U. S. Coast Guard Service, U. S. Lighthouse Service, U. S. Coast and Geodetic Survey, and Bureau of Immigration. In addition to these, Eckliff Circulators have been installed in the boilers of a large number of freighters, steam yachts, fishing steamers and other craft taken over by the United States for government service during the war.

CHANGES IN JOHNS-MANVILLE PERSONNEL

Mr. J. D. Vail, former manager of the Salt Lake City office of the H. W. Johns-Manville Company, has been appointed manager of the Building Materials Department of that company's branch at Chicago.

In the future the Salt Lake City office will be under the management of Mr. C. F. Cate. The Great Falls, Montana, office will be managed independently of Salt Lake City, by Mr. J. H. Roe.

TRUCK MAKERS ARE OPTIMISTIC

"The manufacturer of motor trucks has many reasons for feeling optimistic over the future of his business. The well-known makers have recently closed the most prosperous year of their history, and many of them have been far oversold.

"This has been due to the heavy volume of business which has speeded up industry all along the line.

"To keep pace with the growing demand we have greatly increased the capacity of our Chicago Heights factory, the 'Home of the Little Giant,' and have been able to contract for delivery of a geenrous amount of material for the coming twelve months.

"While the price of horses has steadily increased, the cost of motor trucks, despite the greatly increased costs of labor and raw material, has shown no appreciable rise. This is due to the fact that production has greatly increased, resulting in reduced overhead.

"It is now, therefore, actually cheaper to install a motor truck delivery system than a horse and wagon delivery system. Therefore, firms installing delivery systems for the first time are invariably installing motor trucks, while firms which now use horses and wagons recognize that motor trucks are vastly more economical to operate, more durable and less troublesome, and are making the change to motor trucks as rapidly as their finances permit.

An Important Coal Mining Industry

The development of the oil resources of California had the effect for a considerable period of holding the development of the Western coal-mining industry within extremely conservative lines, but during the past few months coal mining has taken on an added significance. At the present time, the State of Washington is the principal producer of the group of Western States, and about 25 per cent of the normal output, 4,000,000 tons per annum, is credited to the Pacific Coast Coal Company.

The mines of this company are located at Black Diamond, Franklin and Coal Creek, in King county, and at Burnett in Pierce county. These mines are the only industries in these towns and the communities are therefore creations of the coal company. Black Diamond is thirty miles from Seattle, on the line of the Pacific Coast Railroad Company, a sister corporation of the coal company. Franklin is a picturesque mountain village, thirty-four miles from Seattle, on the banks of the Green river; Coal Creek is twenty miles from Seattle, and Burnett is forty-five miles from Seattle. These towns range in population from one thousand to three thousand.

The coal mine development work has been back-

View on top of the Pacific Coast Coal Company's Seattle bunkers, showing towers and coal pockets.

ward during the past few years on account of adverse market conditions, many mines having been closed for the last year or two. The Pacific Coast Coal Company is therefore putting forth every effort at the present time to increase the capacities of its different mines in an attempt to do its share toward taking care of the present increased industrial and household demands, and the outlook for the near future is that the Western mines, as well as the properties in the East, will not possibly be able to fulfill the large demands which will be made upon them.

This company is also putting forth every effort to induce large users of coal to adopt improved fuel-burning methods in order to economize and thereby lengthen the supply; also to enable the full use of the poorer and cheaper grades of coal, and thereby avoid waste. In the installation of automatic stokers to burn lignite pea coal, a saving as high as twenty per cent in quantity is accomplished, and this cheap coal is susbtituted for the higher-priced steam coals, releasing the steam coals to fields in which stokers cannot be used. The price of stoker installations is returned to the purchasers by the saving within a short period of time. This equipment also releases labor for other more useful occupations.

This company is also introducing pulverized coal, which is piped to the boilers and forced through nozzles by compressed air, and burns suspended in the air, the same as oil, enabling the utilization of all of the heating energy in the coal, and eliminating smoke, soot and ashes. Coal has heretofore been burned in this form by cement plants and metallurgical smelters, and will in the near future be adopted by industries in general with very extensive fuel requirements, justifying considerable installation costs; also by railroad locomotives.

This company also established and is operating the only successful coal-briquetting industry in the West, with a capacity of one million briquets per day. The briquets weigh about 10 oz. each—this output being on a single shift. During the past winter this plant has been double shifted to take care of the demand that has been created for this form of fuel. These briquets add to the available quantity of household fuel and their general use in time will materially benefit coal users by keep-

WHITE BROTHERS
HARDWOOD
LUMBER
TIMBER
FLOORING
VENEERS
PANELS
INDIANA BENDING OAK-TEAK-ASH
WHITE CEDAR-IRON BARK-MAHOGANY
— — — LONG OAK KEELS — — —
EASTERN WHITE AND RED OAK, ETC.
FIFTH and BRANNAN STREETS
SAN FRANCISCO, CAL.
THE LARGEST STOCK OF HARDWOODS IN THE WEST

Mouth of "Cannon" mine, Franklin, Washington, and suspension bridge across Gren river leading to Bunker incline.

ing the price of household coal within reason. The "lump" output of Western mines is only from fifteen to thirty per cent of the total output. By doubling the amount of this household fuel through the manufacture of briquets, it can readily be seen that increase of cost due to larger demand than supply will be in a considerable measure forestalled. The contents of the briquets are equal if not superior to the raw coal; thus the only difference between lump coal and briquets is the amount of pressure exercised by nature in binding the lump coal and by machinery in binding the briquets, and by the processes now utilized briquets are bound under sufficient pressure to insure satisfactory burning qualities.

The coal industries will unquestionably move forward within the next few years, due to the present abnormal conditions, to an extent that in ordinary times would require ten to twenty years, and fuel users will find their conditions decidedly bettered by this added industrial development.

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San Francisco, Cal., April 21, 1917.

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The Federal Telegraph Company, utilizing the Poulsen system, has equipped a great number of freight and passenger vessels plying the Pacific during the past three years, breaking the World's record in range and reliability of transmission.

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Our representative will gladly furnish full details relative to rentals and installation, upon application.

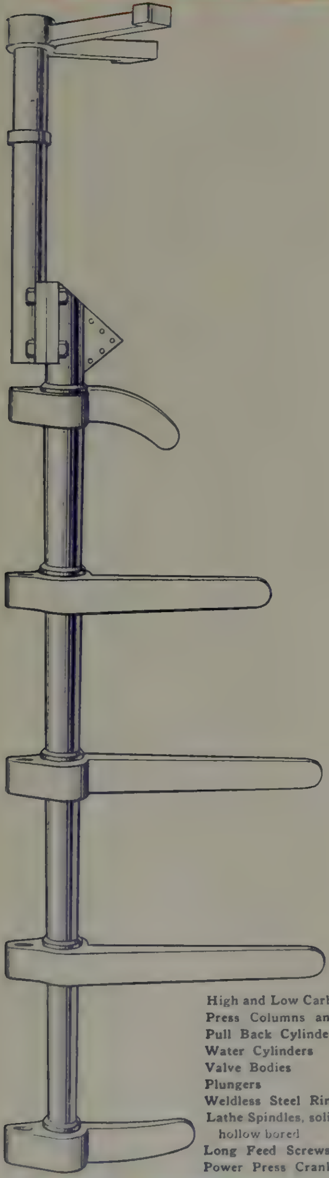
FEDERAL TELEGRAPH COMPANY,
Hobart Building,
San Francisco, Cal.

FOR MESSENGER PHONE GARFIELD 1303

PACIFIC MARINE REVIEW

JULY 1917

CAMDEN



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- Cam Shafts
- Eccentric Shafts
- Crusher Shafts
- Gear and Pinion Blanks
- Locomotive
  - Side and Main Rods
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  - Axles
  - Rod Straps
  - Guides
  - Parts of frame both in iron and steel
- Hammered Iron Bars for locomotive repairs
- Marine Shaft
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- Rolls
  - Bending
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Any forging to your print and specifications, in either iron or steel.

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CAMDEN FORGE CO.

8th and Bulson Ave., CAMDEN, N. J.

PACIFIC MARINE REVIEW
The National Magazine of Shipping

VOL. XIV, No. 7 SAN FRANCISCO JULY, 1917

The Shipbuilding Program

FROM every point of view, one of the most interesting things in our country today is the shipbuilding program of the United States Shipping Board. This interest is intensified by the growing belief that the shipbuilder is being called upon to win the war and that our success or failure as a participant in the struggle against imperialism depends in a great measure upon our ability to turn out tonnage.

When the Shipping Board announced its one thousand wooden ships, the country accepted the utterance as an about-to-be-consummated fact and did not pause to consider just what this program meant in the way of material and labor. We were about to beat the world's record in total tonnage in wooden hulls alone, to say nothing of the speeding up of all the steel yards, but during the past few weeks a saner view has been taken of the situation, and the "thousand" has dwindled to certainly not more than three hundred. The retirement of the more pretentious plan called forth considerable criticism on the Shipping Board, nor can the Board resent this, as it laid itself wide open to censure by going off half-cocked, as it were.

There is another matter, however, far more important than the inevitable curtailment of the wooden shipbuilding program to a point where there was some hope of fulfillment, and that is the evident decision of the Shipping Board and its advisers to have all their vessels steam driven and coal burning. The question naturally presents itself, Was it to the best interests of the country to entirely eliminate the internal-combustion engine as motive power for these boats?

The time limit set for the completion of the wooden ships is sixteen months; that is, a yard is to complete its contract before that time, whether it undertakes to build one or twenty hulls. The vessels are to be single screw, with reciprocating engines or a geared turbine, steam being supplied by two single-ended Scotch or two water-tube boilers, the boilers being fitted for coal burning. It is quite conceivable that the engines and boilers will be a greater problem than the hulls of these craft, and that the fitting of as many internal-combustion engines as the high-class builders could have furnished would have added materially to the number of craft that could be made ready for sea in a specified time. This fact alone, were there no others, should entitle the heavy-oil burning engine to the most careful consideration in the powering of the smaller units of the great merchant fleet projected by the Shipping Board. To assert that it would be feasible to have anything but steam in the majority of the bottoms would, of course, be puerile, but there is a multitude of reasons why the internal-combustion engine should fill as large a part in the program as it is possible for a motive power that is only in its infancy to accomplish.

There has been a great deal of criticism directed at the wooden shipbuilding part of the Shipping Board's program. This criticism has followed roughly along two distinct sets of argument: first, that the wooden ship is a makeshift, that the boats will be thrown together out of green material, and that they will be very shortlived; and second, that the 3500-tonners that survive the war will be utterly unable to compete with the economically operated steel cargo-carrier of from seven to ten thousand tons deadweight.

In answer to the first line of criticism it may be stated that the boats are being built to class fifteen years in the American Bureau, that wooden ships have been in operation in the lumber-carrying trade on the Pacific Coast—the hardest service in the world—in many cases for twenty-five and thirty years, and finally, that there has not been a wooden carrier built on the Pacific Coast in the past fifteen years that has not been built of green timbers. The wooden ship has suffered greatly in the past for want of attention from the classification societies. The rules governing its construction have remained practically unchanged for half a century; in fact, there is so much latitude in the way of fastenings and the disposition of materials that she may be worthless at the end of ten years or she may be as sound as a dollar at the end of thirty. On the other hand, the life of well built, well cared for steel ships does not vary to any great extent. The wooden vessels built to the Government specifications should have a reasonably long term of seaworthiness.

The second line of argument against a great number of small wooden ships savors much more of reason and less of prejudice. It must be conceded that the wooden ship is a secondary consideration, the idea being to supplement the maximum output of steel tonnage with as many wooden craft as can be constructed. For trans-ocean voyages the ratio of bunker space to cargo capacity is too high for economical freighting, and the wooden boats could not live in competition with steel tramps. There is no doubt that practically all the wooden ships that survive the war will be thrown into coastal services, thus disrupting freights and becoming a drug on the tonnage market. If some of these boats were powered with internal-combustion engines, however, they would be able to compete in any general cargo trade owing to their high fuel economy and exceedingly low ratio of fuel to cargo space. Thus it is seen that the introduction of oil engines into some of the Government wooden ships would not only help to relieve the engine and boiler builders of the country from the tremendous strain that is being placed upon them, but also insure a portion of the wooden boats of commercial usefulness after the war.

The internal-combustion engine has reached the point of development in this country where improvements are confined to structural details making for reliability and simplicity. A growing force of men capable of handling these machines is being built up, and the industry has been getting firmly on its feet and looking hopefully to the future. Since cheap transportation is a matter of national importance, and since the internal-combustion engine not only cheapens transportation, but conserves our fuel supply, it is to the best interests of the country to encourage its improvement and production, and what better opportunity could be had of standardizing an internal-combustion motor, bringing down its ultimate cost and advancing heavy-oil engine science at a bound as far as ten years of peace would advance it, than placing internal-combustion engines in a reasonable number of the wooden ships to be contracted for by the Shipping Board.

IMPORTANT SHIPBUILDING DEAL

One of the largest shipbuilding deals of the past month was the purchase of the interests of Henry T. and John T. Scott in the Moore and Scott Iron Works by members of the Moore family. Mr. Albert Moore will be President of the new company and new capital has been secured whereby extensive enlargements will be made. Right on the heels of the announcement of the retirement of the Scott interests the news came from Washington that the concern had been given sixteen large freighters to build by the Shipping Board.

The Scott family, at one time entirely interested in shipbuilding, is now, temporarily at least, practically out of the shipbuilding business. Mr. Henry T. Scott was President of the Union Iron Works for many years and with his brother, the late Irving M. Scott, conducted the financial and business affairs of the big Protrero plant in a way that made possible the building up of one of the largest marine plants in the country despite the great distance from the source of steel. While President of the Moore and Scott Iron Works, Mr. Henry T. Scott acted more in an advisory than an executive sense, having numerous other interests that demanded his time.

Mr. John T. Scott has had a long shipbuilding and machine shop career, having been general superintendent of shops at the Union Iron Works and taking an active interest in the management of the Moore and Scott Iron Works ever since its inception. Whether Mr. John T. Scott will once more enter the shipbuilding field is problematical, but in shipbuilding, like may other professions, they generally drift back.

The Skinner & Eddy Corporation has purchased the property of the Centennial Mill Company, thus making a further extension of their plant possible.

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J. S. HINES . . . . Managing Owner
B. N. DeROCHIE . . . . . Assistant Manager
F. M. DICKIE . . . . Editor
R. E. HANLY . . . . . . Advertising Manager
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THE SUBMARINE PROBLEM

THE general attitude towards the German submarine situation would naturally suggest to the lay mind the old adage that an ounce of prevention was better than a pound of cure. Without delving in tonnage statistics it is well understood that the submarine menace is a serious one and it is also well understood that the finest engineering minds of many countries have been seeking a solution of the problem, but despite these facts it does seem that preventive measures, as applied to the merchant ships themselves, have been somewhat overlooked.

As far as the general public knows, practically all the measures put into effect to curb the destruction of merchant ships by submarines have been of an offensive rather than a defensive character. Thousands of patrol boats are policing the hunting grounds of the underseas craft and there is every reason to believe that the Germans are paying as well as exacting a heavy toll, but the formula for open submarine warfare seems to have as a basis in every case—first find the enemy.

In restricted areas of shallow water, nets and traps are being used with, we hope, no small degree of success and the question naturally presents itself,—is it not possible to create a restricted area about every merchant ship of any considerable size?

We believe that it is possible to make a freighter practically immune from torpedo attack and that this can be accomplished at a cost amounting to less than five per cent of the value of the ship and at a sacrifice of less than five per cent of her deadweight capacity.

Since the wholesale arming of merchantmen the submarine has been confined largely to the use of the torpedo, and a vessel that was protected from the torpedo would have the double value of not only being immune but also of causing the German "U" boats to waste a lot of their undersea missiles and torpedoes are costly, both in the matter of marks and labor.

That some mechanical means of safeguarding the merchant ship from torpedo attack will prove the solution of the submarine menace rather than such instruments as electrical detectors of hidden masses of metal or echoes secured from rebounding sound waves is our serious belief. The latter instruments may be perfected so as to locate a submarine with reasonable accuracy, but the location of the enemy is but a part of the problem. To present a fair target to the "U" boat and then to have the enemy discover that his torpedoes, however carefully fired, were not "getting home" would soon put an end to submarine warfare.

THE STANDARD WOODEN SHIP

AS we will be called upon frequently to mention the Government standard wooden ship in these columns, we are giving herewith a brief description of the vessel in order to avoid the reiteration of dimensions and other data in regard to the many contracts that have been placed for these craft in our Western shipyards.

The Government standard wooden ship will be schooner rigged, with two pole masts, machinery amidships, two holds, each served with two overall hatches and each hatch served with two cargo booms. There will be a short forecastle and poop, the main accommodations for officers, gun crews, etc., being located in the midship house.

The design is by Theodore E. Ferris, N. A., of New York, and in general the hull structure is considerably lighter than that obtaining in west coast practice where heavy lumber deckloads are always contemplated in wooden ship design.

The vessels are 281 feet 6 inches long over all, 268 feet long between perpendiculars, 46 feet beam over planking, 45 feet 2 inches beam moulded, 26 feet depth moulded, and with about 3000 tons of deadweight they are expected to draw 23 feet 6 inches.

The ships will be of the single-deck type, with open holds, but fitted with 'tweendeck beams. The frames will be double 12 inches sided by 13 inches moulded at keel, tapering to 10 inches moulded at the deck, and spaced 36-inch centers. These will be of yellow pine or Douglas fir, depending upon the location of the contract. The keel is 16 inches sided by 14 inches moulded, and is fitted with a 3 by 16-inch oak shoe. The garboard strakes are of yellow pine, 10 by 14, 8 by 14, and 6 by 14 inches respectively. The bottom planking to the bilge is 5 by 14 inches, on the bilge 6 by 10, and the sides 5 by 10 inches. The upper planking strakes are 5 by 8 and the topsides 6 by 8 inches. The ceiling is 10 by 12 inches, increased at the bilges to 14 by 14 inches. There are six main keelsons and two side keelsons, all 14 by 14 inches. There is also wing girder keelsons, 10 by 14 inches in size.

There is a double row of stanchions throughout the holds, with additional stanchions at the hatch corners. Torsional strains are taken care of by iron strapping outside the frames. The top chord of the strapping system is at the upper deck beams and consists of ¾-inch plate, 8 inches wide, extending the full length amidships from 12 feet forward of the forward end of the forward hatch to twelve feet aft of the after end of the after hatch. This chord is fitted with triple-riveted butts and is fastened to each frame by two 1-inch bolts. The diagonal straps consist of 4 by ½-inch iron bars let in flush with the frames. These bars are laid on at 45° angles each way and meet the top chord in every other frame space; in other words, every six feet. The diagonals are fastened to the chord with two ⅞-inch rivets and there is a 1-inch rivet at each crossing of the straps. The diagonals are also fastened to each frame timber by a 1-inch bolt and are carried well around the turn of the bilge so as to overlap the ends of the floors.

The vessels will be fitted with accommodations for a crew of thirty and also for a Government gun-crew of twelve men, and will be armed with a bow and stern gun. The electric-light plant, wireless outfit, steering gear, windlass and winches will follow the usual mercantile practice.

Considerable latitude is allowed in the choice of type for propelling machinery, it being obvious that the Government will have to resort to practically every proven type of drive if the machinery output is to keep pace with the finishing of the hulls. For a single-screw vessel with reciprocating engines, the cylinders will be 19, 23¼, and 54 inches in diameter by 42 inches stroke, designed to indicate 1400 horsepower at 90 revolutions. The condenser is to have 2500 square feet of cooling surface.

The engines for the twin-screw type will have cylinders 14¾, 25, and 42 inches in diameter by 27 inches stroke, and each engine will indicate 700 horsepower at 115 revolutions and 900 horsepower at 133 revolutions. These vessels will be fitted with two surface condensers of 1300 square feet cooling surface each.

The turbine-driven vessels will have one double reduction geared turbine delivering 1400 shaft horsepower with the propeller turning at 100 revolutions. The reversing turbine must deliver two-thirds the power of the ahead turbine.

In all vessels, steam is to be delivered at 190 pounds either from two three-furnace Scotch boilers 14 feet 6 inches inside diameter by 11 feet 2 inches long, having a total heating surface of 4500 square feet and a grate area of 105 square feet, or by water-tube boilers having a total heating surface of 5000 square feet.

These vessels are being let out on a lump-sum contract with payments to be made as follows: first payment within thirty days of signing the contract; five per cent of the total within 60 days of signing the contract; five per cent within 90 days of signing the contract; twenty per cent when keel is laid; ten per cent when hull is completely framed; fifteen per cent when hull is launched; ten per cent when machinery is installed, and the balance thirty days after acceptance and delivery of the finished job.

THE MERCHANT MARINE QUESTION

IN these days we are hearing a great deal about the marvelous growth of the American merchant marine, but when we come to analyze the results of all the feverish activity in our shipyards we find that this growth has been surprisingly small. Despite all of our shipbuilding and despite the fact that the world's chief sea carrier is greatly hampered through German submarine activity and the wholesale commandeering of vessels for Government use, the United States has only succeeded in bettering its share of the cartage on American exports and imports by about five per cent.

The reason for the slow growth of the American foreign trade merchant marine lies in the fact that we are expending a great deal of our ship building energy towards building up the merchant fleets of other nations. A goodly proportion of the tonnage now under way in United States' shipyards is for foreign owners. This percentage is not alarmingly high when viewed as a ratio of the total tonnage under construction, but if we eliminate oil tankers and domestic craft and consider only the foreign trade cargo ship, then we find that the additions building and projected for use in our foreign trade under the stars and stripes are immeasurably less than they ought to be. There is a grave danger in this situation, not only to the prosperity and growth of the American merchant marine, but also to the shipbuilder, since the history of all shipbuilding nations has shown that no people can become great shipbuilders without also being great shipowners. We cannot go on indefinitely building ships for others unless we continue to build them for ourselves.

The cost of new tonnage, measured by pre-war standards, has risen to a remarkable figure. At first glance, the layman would be apt to come to the conclusion that the shipbuilder is making enormous profits. There is another side to this question, however. The builder is contracting for work to be completed far in the future. The yards are crowded and in the United States to-day it is hardly possible to secure delivery under from twenty-four to thirty months. All contracts are made in the face of a rising market. Shapes and plates have risen in price by leaps and bounds, all the other materials and outfit entering into the makeup of a modern steamer have risen proportionately and furthermore all work is rushed with the consequent high labor costs which such working conditions make unavoidable. Against all these causes which increase production cost, the shipbuilder has but one weapon and that is the resource to a standardized ship. Most of the American yards are turning out but one or two types of ship. A yard will build a certain sized hull, the owner having the option of shifting the bulkheads and deciding upon type of drive. Under present working conditions, however, the economies offered by building a standard dimensioned hull are more than offset by the conditions under which the work must be performed and the uncertainty of material deliveries, to say nothing of the vast increases in the price of all materials.

The position of our coastwise steamship companies is also unfortunate. These concerns operate under close governmental supervision as to passenger and freight rates, and the limitations fixed under this supervision are founded upon the cost of tonnage production prior to the time that the shipbuilding boom struck this country. Such companies cannot see their way clear to make needed additions to their fleet under the present cost of building new tonnage.

With foreign owners steadily placing orders in American ship yards, it is apparent that steel prices will be as high, if not higher, at the close of 1918 than they are today. As long as abnormal freight rates remain in force it is evident that the American ship can continue profitably in the foreign trade despite her high initial cost, but if this ship is to remain under the American flag through the gradual decline in freights which must come and on into the period of international rivalry for sea trade which is inevitable, her owners must utilize a goodly portion of her "war profits" in writing down her book value to a figure commensurate with her declining ability to produce large profits. This is precisely the course being followed by practically every foreign shipowner in order that his ships may be ready to go to sea on a competitive basis when normal times have returned, and it is this careful policy upon the part of our future competitors which makes it imperative that America should venture on the deep sea to-day despite the high cost of shipping.

Is there any way in which the cost of tonnage building or to be built for American owners can be lowered? This is a question of vital importance to our nation. If the shipbuilder is making a good profit to-day, no one who has followed the financial history of this industry during the past twenty years will begrudge him a fat year or two after so many lean ones. In any case, his ability to stem the rising tide of shipbuilding costs is very meager. If it were possible, however, for the American steel industry and the American shipbuilding industry to co-operate in a broad-minded, patriotic manner with a view to speeding up delivery and lessening production costs of ships for bonafide American owners, there is much that might be accomplished towards inducing American capital to flow freely into the foreign carrying trade of our country.

AN EXPECTED RESULT

THE removal of two mining engineers from the managing forces of the federal shipping corporation could hardly be expected to create surprise in shipping circles. These gentlemen descended upon Washington with a scheme for a thousand wooden ships, and the Shipping Board accepted them as being inspired messengers. What they had to offer the Government was nothing remarkable or even new. The Pacific Coast has been turning out wooden craft of larger sizes than the government ship, but the turning out of these vessels to the tune of one thousand is certainly "a gray horse of a different color." We want, in addition to all the steel ships that can be built, all the wooden vessels that can be constructed, but the best method of securing these craft and managing them after they are completed are hardly matters in which we look to mining engineers for a solution. This shipping board episode reminds us that we must expect serious mistakes in the conduct of the government's shipping business, and we will be indeed fortunate if nothing more serious than the Eustis and Clarke unpleasantness turns up; for it is quite evident that these gentlemen were actuated solely by patriotic motives and made a mistake of the head rather than the heart.

The Port of Astoria will require about $500,000 to carry out the work programmed for this summer, which includes the following: Erection of the first unit of the bulk grain bins, $219,000; the installation of a coal and freight handling crane, $18,000; the purchase of a new port dredge at $85,000; improving pier No. 2 by decking the roadway and the possible erection of a second warehouse to enable the port to handle as much of the 1917 grain crop as possible will, with current expenses, eat up the balance of a half million.

In the National Capitol

IN connection with the quiet campaign of preparedness which is being carried on under the orders of Franklin D. Roosevelt, Assistant Secretary of the Navy, and about which there has been no previous public announcement, an active effort has been under way during the last month to procure sea-going yachts for immediate war duty. Vessels of this kind must be not under 110 feet in length, with sea-going ability and of large cruising radius. The Government will employ a large number of such vessels as auxiliaries to the other fighting units of the navy, and the patriotic spirit of many owners who have already come forward to turn over their vessels for this valuable service is worthy of commendation. Not only from ports on the Atlantic Coast, but from various points on the Great Lakes a fleet is being rapidly mobilized, and a number of fine yachts, now in process of alteration, will very shortly be added to the fleet of the navy.

About a month ago the Assistant Secretary of the Navy organized a Special Board for Patrol Vessels, whose duty is to secure suitable boats with all possible dispatch. One of the first moves of this board was to have the International Mercantile Marine Company, 9 Broadway, New York City, designated as the official agents of the Special Board. This brings to the assistance of the navy in these times of stress the services of the International Mercantile Marine Company's large staff of shipping experts, all of whom are giving their services without remuneration. The navy yards, in their present crowded condition, are thus relieved of a great deal of work, and under this new arrangement owners also are assured of immediate payment for their boats, dispensing with the time-consuming formalities which ordinarily are followed in dealing with the Government departments. The International Mercantile Marine Company is also supervising all alterations above and below decks, arming, outfitting, coaling and provisioning the ships and delivering them, painted in war colors, to the Navy Department for sea duty. The Special Board for Patrol Vessels is acting in an advisory capacity and is preparing to man all these ships promptly. Such well-known yachts as "Carola IV," "Nokomis I," "Emeline," "Wanderer," "Corona," "Zara," "Remlik," "Sialia," "Alcedo," have already been taken over by the Government and are in process of alteration.

There is at present before Congress a bill authorizing the requisitioning for this special sea service all available boats of suitable size and other qualifications, but before this law becomes effective the Special Board for Patrol Vessels and the International Mercantile Marine Company would be very glad to hear from any yacht owner who cares voluntarily to offer his craft for service against the enemy. The work to be accomplished is of an extremely important military nature, so that any owner placing his boat at the disposal of the Government will render the greatest possible service, and, owing to the arrangement with the International Mercantile Marine Company, will receive payment without delay or formality.

THE URGENT DEFICIENCY BILL

The Urgent Deficiency Bill, one of the most important and far-reaching measures ever acted upon by Congress, contains the following provisions:

"The President is hereby authorized and empowered, within the limits of the amounts herein authorized—

"(a) To place an order with any person for such ships or material as the necessities of the Government, to be determined by the President, may require during the period of the war and which are of the nature, kind, and quantity usually produced or capable of being produced by such person.

"(b) To modify, suspend, cancel, or requisition any existing or future contract for the building, production, or purchase of ships or material.

"(c) To require the owner or occupier of any plant in which ships or materials are built or produced to place at the disposal of the United States the whole or any part of the output of such plant, to deliver such output or part thereof in such quantities and at such times as may be specified in the order.

"(d) To requisition or take over for use or operation by the United States any plant, or any part thereof without taking possession of the entire plant, whether the United States has or has not any contract or agreement with the owner or occupier of such plant.

"(e) To purchase, requisition or take over the title to, or the possession of, for use or operation by the United States any ship now constructed or in the process of construction or hereafter constructed, or any part thereof, or charter of such ship.

"Compliance with all orders issued hereunder shall be obligatory on any person to whom such order is given, and such order shall take precedence over all others and contracts placed with such person. If any person owning any ship, charter, or material, or owning, leasing, or operating any plant equipped for the building or production of ships or material shall refuse or fail to comply therewith or to give to the United States such preference in the execution of such order, or shall refuse to build, supply, furnish, or manufacture the kind, quantities, or qualities of the ships or material so ordered, at such reasonable prices as shall be determined by the President, the President may take immediate possession of any ship, charter, material, or plant of such person, or any part thereof without taking possession of the entire plant, and may use the same at such times and in such manner as he may consider necessary or expedient.

"Whenever the President shall cancel, modify, suspend, or requisition any contract, make use of, assume, occupy, requisition, acquire, or take over any plant or part thereof, or any ship, charter, or material, in accordance with the provisions hereof, it shall make just compensation therefor, to be determined by the President; and if the amount thereof, so determined by the President, is unsatisfactory to the person entitled to receive the same, such person shall be paid seventy-five per centum of the amount so determined by the President and shall be entitled to sue the United States to recover such further sum as, added to the seventy-five percentum, will make up such amount as will be just compensation therefor, and in the manner provided for by section 24, paragraph 20, and section 145 of the Judicial Code.

"The President may exercise the power and authority hereby vested in him and expend the money herein and hereafter appropriated through such agency or agencies as he shall determine from time to time; provided, that all money turned over to the United States Shipping Board Emergency Fleet Corporation may be expended as other moneys of said corporation are now expended. All ships constructed, purchased, or requisitioned under the authority herein, or heretofore or hereafter acquired by the United States, shall be managed, operated, and disposed of as the President may direct.

"The word 'person' as used herein shall include any individual, trustee, firm, association, company, corporation, or contractor.

"The word 'ship' shall include any boat, vessel, or submarine and the parts thereof.

"The word 'material' shall include stores, supplies, and equipment for ships, and everything required for or in connection with the production thereof.

"The word 'plant' shall include any factory, workshop, warehouse, engine works; buildings used for manufacture, assembling, construction, or any process; any shipyard or dockyard and discharging terminal or other facilities connected therewith.

"The words 'United States' shall include all lands and waters subject to the jurisdiction of the United States of America.

"All authority granted to the President herein, or by him delegated, shall cease six months after a final treaty of peace is proclaimed between this Government and the German Empire.

"The cost of purchasing, requisitioning or otherwise acquiring plants, material, charters, or ships now constructed or in the course of construction and the expediting of ships thus under construction shall not exceed the sum of $250,000,000, exclusive of the cost of ships turned over to the army and navy, the expenditure of which is hereby authorized, and in executing the authority granted by this Act for such purpose the President shall not expend or obligate the United States to expend more than the said sum; and there is hereby appropriated for said purposes, $150,000,000; provided, that this appropriation shall be reimbursed from available funds under the War and Navy Departments for vessels turned over for the exclusive use of those departments or either of them.

"The cost of construction of ships authorized herein shall not exceed the sum of $500,000,000, the expenditure of which is hereby authorized, and in executing the authority granted herein for such purpose the President shall not expend or obligate the United States to expend more than said sum; and there is hereby appropriated for said purpose, $250,000,000.

"For the operation of ships herein authorized or in any way acquired by the United States, except those acquired for the army and navy, and for every expenditure incident thereto, $500,000,000."

The Sundry Civil Bill has been approved by President Wilson and the Auditor of the Canal will now or soon be in a position to refund excess tolls collected on deck loads.

Senator Poindexter introduced a bill in the Senate on June 11, calling for a total expenditure of $20,000,000 and an initial expenditure of $10,000,000 for the construction and equipment of a naval base at Guam.

The same Senator on the same date also introduced a bill carrying $24,000 for four mooring buoys in Seattle harbor.

General Goethals has appointed Admiral H. H. Rousseau as assistant general manager of the Emergency Fleet Corporation and Mr. Samuel L. Fuller as assistant to the general manager to succeed Mr. F. A. Eustis and Mr. F. H. Clark, the two mining engineers who resigned following the paring down of their proposed wooden ship building program.

The Peninsular and Oriental Steamship Company has concluded a merger deal with the Union Steamship Company of New Zealand on the basis of 10s of P. & O. deferred stock plus 30s in cash for each one pound ordinary Union Steamship share. The Union Steamship Company of New Zealand's issued capital is 2,000,000 pounds, half in ordinary and half in preferred shares. The fleet consists of 76 steamers of 243,000 gross tons. This will bring the total P. & O. tonnage up to 1,725,000.

Alameda's Great New Shipyard

THE Union Iron Works Company purchased the plant and property of the United Engineering Works on February 13, 1916. This plant was located on the Alameda side of the Oakland estuary and at the time of purchase consisted of a small shipyard for building steel vessels, joiner, carpenter and smith shops, and a fairly modern machine shop that was well equipped for building marine reciprocating steam engines. There was also on the property two marine railway docks, one of 2000 and the other of 4000 tons capacity.

View of a portion of the Alameda plant waterfront at the time the property was acquired by the Union Iron Works Company.

The object of the Union Iron Works Company in purchasing this well-known plant was to obtain more room for expansion, as the Protrero property in San Francisco had become cramped and the plant at that point was badly handicapped for carrying on the great amount of work that the company had in mind.

At the time of purchasing the United Engineering Works property, the Union Iron Works purchased additional acreage and also secured on a long-time lease from the City of Alameda additional water frontage so that the shipbuilding property today has an area of seventy-eight acres with two-thirds of a mile of water frontage.

Immediately upon acquiring this property improvements were commenced; in fact, the first pile for the new shipbuilding berths was driven within one month of the date of purchase. These berths, as shown in the accompanying views, were entirely completed and the first ship, the "Talabot," a vessel of 10,000 tons deadweight capacity, was launched on November 11th, 1916, less than nine months from the purchase of the property.

Rapid progress was made in the construction of the plate shop and power house and in the installation of modern machinery. The remarkable strides shown in the preparation of this plant is shown by the fact that not only was a great plant created, but practically during this creation the following vessels were launched: The "Talabot" of 10,000 tons deadweight, the "Bessa" of 10,000 tons deadweight, the "Regulus" of 6,000 tons deadweight, the "War Knight" of 10,000 tons deadweight, the "War Monarch" of 10,000 tons deadweight and the "Dicto" of 6000 tons deadweight. In addition to this 52,000 deadweight tons of shipping, the "War

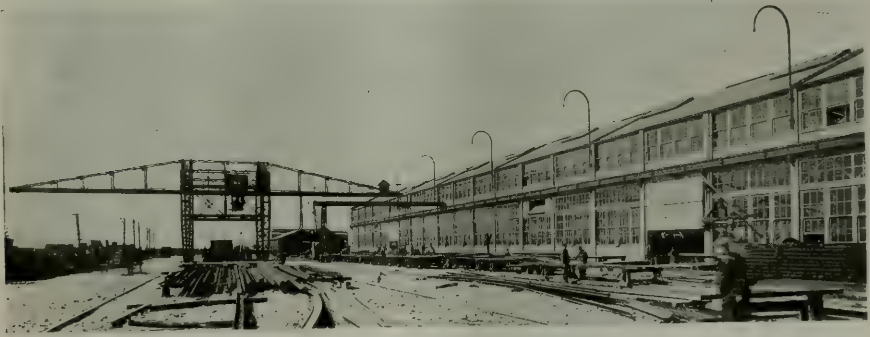
Mr. John A. McGregor, President of the Union Iron Works Company, delivering an address to the men on the occasion of the laying of the first keel at the Alameda plant.

Sword," another 10,000-ton deadweight freighter, and two powerful sea-going tugs of 1,000 hp. capacity for Jas. Rolph. Jr. will be launched during the present month.

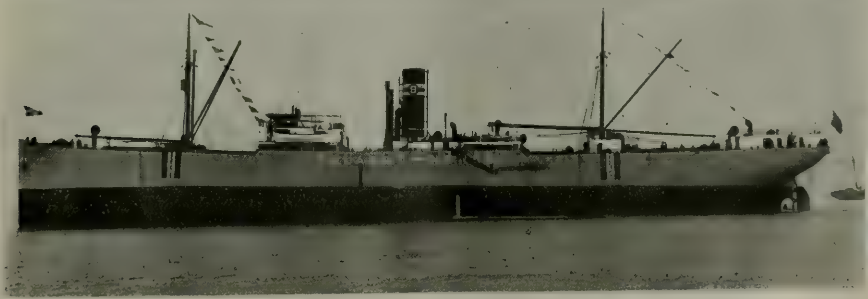
Plans have been prepared for the installation of two additional building berths, which will be able to accommodate the largest ship ever built—in fact, the Alameda branch of the Union Iron Works will be one of the great shipyards of the world.

Among the additions to the establishment now under way is a machine shop to be specially built and equipped with the most modern tools for the building of geared turbines. This shop will have a length of 560 feet and a width of 165 feet and will conform to the most modern construction and ideas known in machine shop practice. This building will be constructed of steel, faced with brick. The floor will be a reinforced concrete slab carried on deep pile foundations and faced with end-grained wood blocks. The main shop span will be served by 80-ton cranes. There will be

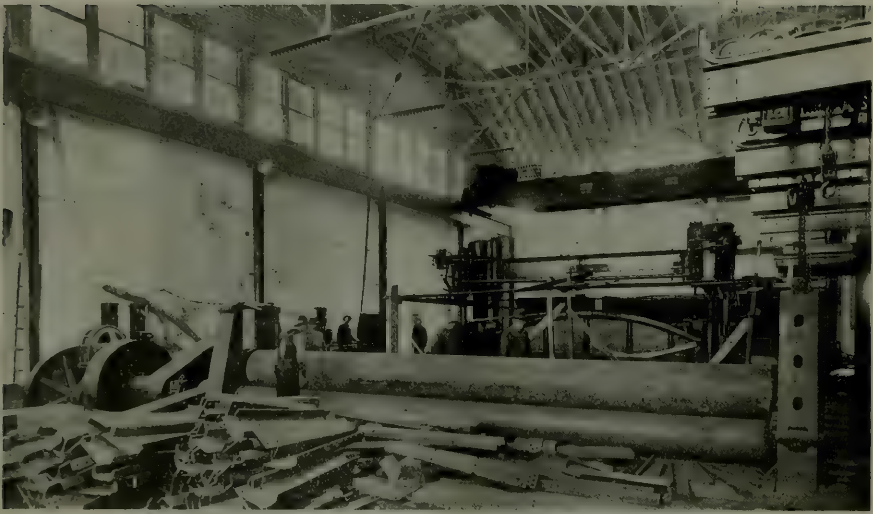
Mr. J. J. Tynan, Vice-President and General Manager of the Union Iron Works Company.



Exterior of the plate shop, showing large traveling gantry for handling material in the plate storage space.



The "Talabot," one of the first products of the Alameda branch of the Union Iron Works Company.

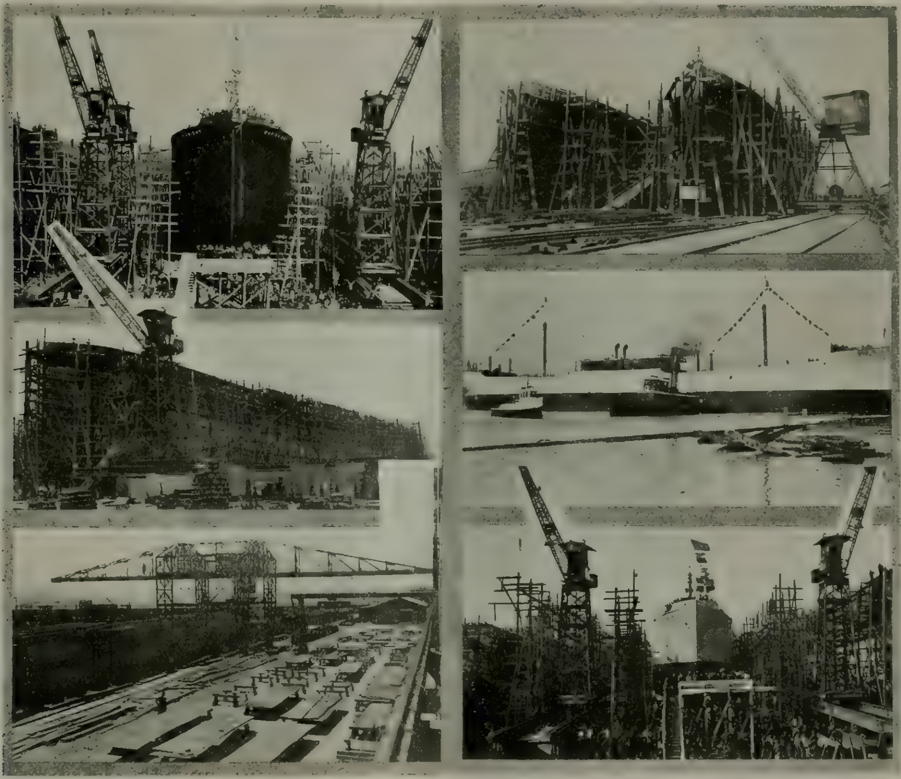


A corner in the plate shed at the Alameda branch of the Union Iron Works.

The mould loft at the Alameda branch of the Union Iron Works is a splendid example of the superiority of western lumber for mould loft floors.

Interior of the plate shop, showing the great expanse of floor space between tools for laying out work.

The "Bessa," a 10,000-ton deadweight freighter recently delivered to her owners from the Alameda plant of the Union Iron Works Company.



Some views in the Alameda plant: Upper left, the "War Knight"; upper right, the two Rolph tugs; center right and center bottom are of the "Dicto" before and after launching, and lower left is the plate and shape handling gantry and storage space.

The "Regulus," one of the products of the Alameda plant.

galleries on each side for small machine work.

The most modern and highest class of machinery will be fitted throughout, and all machines will have independent motor drives and be protected with the latest safety devices in order to cut down accidents to workmen to the very lowest minimum. It is the intention to build all of the geared turbines requred by the company's building program in this shop.

In addition to this specially designed steam turbine shop, there will be built forge shops, iron and brass foundries, pattern shop, a great warehouse store room and a modern office structure for yard officers, inspectors and draftsmen. It is expected that when the plant is completed that fully 10,000 men will be employed on the premises.

The company is now installing a fitting-out wharf, which will be 1600 feet in length. Adjoining this wharf will be shops for the marine machinists, coppersmiths, electricians, pipe fitters, riggers and plumbers; in fact, a complete equipment such as is required by a modern yard where ships can be built complete, hulls and engines, and fitted out for sea.

Early Shipbuilding on the Pacific Coast

San Francisco Bay

By J. Wyllie

THE start of shipbuilding on San Francisco bay merits a chapter by itself, not alone from the importance of the industry, but from the fact that here was found the most primitive of all aboriginal craft. These were boats made of reeds and grass like the "balsas" of the Andean lakes, so that our local shipbuilding may be said to have literally sprung, like Moses, from the bulrushes.

To Captain George Vancouver we are indebted for a description of these native craft. Writing under date of November 15, 1792, he said: "On moving to the general anchorage (in front of the Presidio) a message from Commandant Sal was brought by three Indians who came off in a canoe of their country, * * * without exception the most rude and sorry contrivance for embarkation I had ever beheld. The length of it was about ten feet, the breadth of it about three or four; it was constructed of rushes and dried grass of a long broad leaf, made up into rolls the length of the canoe, the thickest in the middle, tapering to a point at each end. These are so disposed that on their ends being secured and lashed together the vessel is formed, which being broadest in the middle, and coming to a point at each end, goes with either end foremost. * * * The wind now blew strong, with heavy squalls from the southwest, and in the middle of this spacious inlet the seas broke with much force, notwithstanding which, as soon as they had delivered their message, they crossed the inlet without seeming to entertain the least apprehension for their safety. They conducted their canoe by long double-ended paddles like the Esquimaux."

In 1816 Senor Arguello, then Commandant at San Francisco, wishing to repair and enlarge the Presidio buildings, had an Englishman build and rig a small boat or launch with which to bring the necessary timbers from across the bay. The Spanish soldiers did not care to risk their lives in the native boats; for, in order to reach Corte Madera, where the timber was procured, they had proceeded "around the horn," crossed Carquinez straits on a raft, and thence traveled overland via San Rafael. The new boat served its purpose very well, although on one occasion, with a raft in tow, it was carried out nearly to the Farallones by the strong ebb tide. The crew held onto the raft, however, and a westerly breeze springing up, they finally reached their destination minus a few meals.

When Governor Sola heard of his energetic subordinate's activities, he was exceeding wroth, and the affair nearly terminated in a duel. Hostilities were averted, however, but the cause of the ruction was sent to Monterey, where it is to be hoped that the governor was placated by the sight of his new "yacht" breaking the waste expanse of Monterey bay.

In 1822 the Mission schooners were placed in charge of William Richardson, who had left the English whaler "Orion," of which he was the mate, and settled at Sausalito. When he became commodore of the Mission fleet, Richardson moved to the San Francisco side of the bay, where he conducted a transportation and trading business between this port and up-river points.

The first steamer to navigate the waters of the bay was the "Sitka," a side-wheel steamboat about thirty-eight feet in length, built at the Sitka yard, purchased by Mr. Leidesdorf and brought to San Francisco on the deck of the Russian barque "Naslednik" in October, 1847. The "Sitka" must have had poor steaming powers, for, with the owner and a party of guests aboard, it took her over six days to make her first trip to Sacramento. This was in November, 1847. In the February following she was wrecked while at anchor by a "norther" and was hauled ashore, the machinery removed and the hull rigged as a schooner (a yawl, more likely). Under the name of "Rainbow" she continued in service and with favoring winds made a better rate of speed than she had with steam power.

It is doubtful if complete lists were ever kept of the small vessels built about the time of the American occupation, and for a certainty it is impossible to do credit to them all at this late day. Bancroft says that a launch was advertised in the "Californian" of April 26, 1848, to sail to Feather River points. The "Indian Queen," a sloop of ten tons, and the "White Pinnace," a yawl, were also engaged in the river trade at that time. No mention can be found of where these were built, but honors run pretty even, Napa, Benicia, Stockton and Sacramento all having begun about that time to turn out small vessels for local requirements.

At Bolinas, in 1854, Thomas and William Johnson started a yard with the "Louisa," a 50-ton schooner, and continued for a good many years to turn out small vessels. At the same place, in 1855, Captain Almy built a 19-ton schooner, the "Joseph Almy," which was used for a pilot boat until 1878, when she was wrecked within a stone's throw of the spot where she was launched.

The old steamer "Yosemite," a craft that enjoyed a long and varied career before piling up on a reef.

Although Sacramento also claims the honor, Benicia appears to have the best title to the first steamer built in California, the "Washington," launched in August, 1849 (also referred to as the "Pioneer"). This vessel ran to Sacramento and Marysville, but early in her career was snagged and sunk in the Feather river. She was raised and renamed the "Ohio," but of her subsequent service I am unable to learn. The second steamer was the "Sacramento," launched at that place in September, 1849, also a side-wheeler for bay and river trade.

Unlike other great seaports, which grew slowly through the natural processes of evolution, San Francisco may be said to have sprung up in the throes of revolution, so great and sudden was the change from the lazy Spanish regime to the frenzied rush of the Argonauts. Almost from the start the port found itself in the unique position of having more ships than crews to man them, but with every arrival of deep-water ships the demand for light-draft vessels grew still greater. By the end of 1849, besides a long list of sailing craft, a number of small steamers were employed in transporting the Argonauts and their supplies to points near the mines.

The "Paul Pry" launched in 1856, was perhaps the first steamer of exclusive California manufacture, most of those built previously having been knock-down boats brought from the East. The earliest plant on the bay of which I can find any record was Captain Marcucci's yard, between Folsom and Beale streets, where a knock-down boat sent out from Philadelphia was put together. This steamer, the first launched on San Francisco bay, was named the "Captain Sutter" and had her trial trip on November 16, 1849. This yard was kept busy turning out all sorts of small craft, and during the next decade produced half a dozen small steamers and a similar number of sailing craft. In 1859, Marcucci launched the "Flora Temple," a side-wheeler, for the Sacramento river; in 1850, the coasting schooner "Fannie" for the lumber trade, and in 1861 the barkentine "Monitor," which remained in service for many years. By 1870 this builder had turned out ten other vessels, mostly steamers.

One of the busiest places on the waterfront in the early days was known as Steamboat Point, between Third and Fourth and Berry and Townsend streets. Here was located the shipyard of Captain John G. North, who was a leading figure in pioneer shipbuilding. At this yard the stern-wheeler "Phineas" was built in 1852, followed by a number of schooners and barges. In 1854 the first vessel built on the bay for foreign owners, the side-wheeler "Flor de las Andes," was launched and sent to Costa Rica. After this came the "Clara," an Alameda ferry steamer, and the "Susan and Kate Deming," named after popular actresses of the day, and the first three-masted schooner built on this coast for foreign trade. I have been unable to learn if the fair damsels stood sponsor for their namesake, but from all accounts the christening was no grape juice affair.

In 1860, the "Chrysopolis," of 950 tons, the largest, fastest and finest steamer on the bay, was launched. To quote from Captain North's narrative: "She was launched on a beautiful moonlight night, the 2nd of June, 1860, and all San Francisco came down to Third and Townsend to see it." On her trial trip the "Chrysopolis" made the run from her pier to Benicia in the record time of one hour and nineteen minutes. Later in this year, North bought Potrero Point and moved his equipment over there. The first work done at the new yard was the rebuilding of the New York steamer "Brother Jonathan," for which hauling-out ways had been laid. Working tides, with a couple of hundred Chinamen hauling on the tackles, the vessel was landed above tidewater, to the great relief of all concerned, and the first of many jobs of its kind performed at the Potrero under more favorable conditions was successfully accomplished in 1861.

In 1862 the crack steamer "Yosemite" was launched at North's yard and placed on the Sacramento run. In 1865 her boilers exploded, killing fifty-five persons and scalding and maiming many others. She was repaired and continued on her run until 1883, when she was sold to the Canadian Pacific Navigation Co., taken north and placed in the ferry service between Victoria and Vancouver. The "Yosemite" was a 16-knot boat and for many years one of the fastest vessels on western waters. Her long-continued record for speed was due in no small measure to Roderick McIver, her chief engineer during the greater part of her northern career. "Rod," from his devoted attention to his engines, might have stood for the original of Kipling's McAndrew:

"Men, ay an' women, call me stern. Wi' these to oversee,
Ye'll note I've little time to burn on social reparatee."

Before the days of twin screws and turbines, the old steamer gave the commodores on the Canadian Pacific fleet a chance to win many a race on the waters of the Gulf of Georgia.

The "Yosemite's" dimensions were: gross tonnage, 1319; length, 269 feet; breadth of hull, 35 feet, and depth, 11 feet 6 inches. She had a beam engine with cylinder 60 inches bore by 10 feet stroke, and had the usual poppet valves operated with rocker arms. In 1908 she was sold to Captain Grant, of Seattle, and returned to American registry. While carrying excursionists to the Bremerton Navy Yard on July 9, 1909, she went ashore in Port Orchard Narrows and broke her back, becoming a total loss.

In 1865 Captain North launched the steamer "Capital" for the Sacramento run. By this time the rather crude appearance which had marked many of the earlier vessels had disappeared and the graceful lines and elegant appointments of the "Capital" were declared by travelers to be the equal of any of the flash packets on the Mississippi and Hudson rivers. Indeed, our people were entitled to these conveniences and comforts, since most of them had experienced to the full the discomforts incidental to pioneering.

By the time of his death in 1872, Captain North had turned out 53 bay and river steamers and 273 hulls of all descriptions, besides leaving the transformed rocky point of the Potrero as a monument to his industry and enterprise.

Henry Owens was another of the earliest builders. Descended from generations of boat builders on the Bristol channel, when he landed from the steamer "Golden Gate" in May, 1852, as an employee of the Pacific Mail Company, Owens speedily foresaw the possibilities for a man of his trade, and, leaving the company's service, he went to Oregon, where, in 1852-53, he built two sternwheelers on the Willamette.

Returning to San Francisco, Owens started a yard at Steamboat Point, amongst a number of vessels turned out being the schooner "Elizabeth Owens," launched in 1857, from which it might be inferred that he had entered the shipping business as well. In 1858, he contracted with a Captain Barclay to build a steamer on the Sound for the Fraser river. This was the "Julia Barclay," already mentioned, built by Owens at Port Gamble. The job completed, Owens returned to his plant in San Francisco, where he continued to add to the home-grown fleet. In 1862 he also moved to the Potrero, where his stocks and hauling-out ways added to the general activity which was making the southern district of San Francisco the shipbuilding center of the Coast. In 1865 Owens built the "Del Norte," a passenger and freight steamer, for Ben Holliday. This vessel, the pioneer of its kind from Coast yards, was launched December 10. The well known Puget Sound steamer, "North Pacific," was also a product of this yard and was built during the winter of 1867-68. About this time the McDonald brothers had leased part of the yard and constructed a number of vessels, among them being the large coasting schooner "Rosella." In 1868 R. H. Pearsons purchased the plant and continued the output.

Hunter's Point became the scene of boatbuilding operations in 1867 when George Middlemas started on the caisson for the first graving dock. In the following year he built the tug "Joseph H. Redmond" and the steamer "Gipsy." As a designer of steamers and sailing vessels, Middlemas was always in demand, one of his creations being the full-rigged ship "Olympus," the largest single-deck wooden ship ever built. This vessel was built at Seabeck, on Hood's Canal, Puget Sound, by Hiram Doncaster for W. J. Adams, then one of the foremost shipping men of the Northwest. This ill-fated ship was launched August 21, 1879, and burned at sea off Gray's Harbor in 1883 while on a voyage from the sound to San Francisco. She was 237 feet long, 44 feet beam, and 18 feet depth of hold, and her capacity was 1,400,000 feet of lumber. In 1870 Middlemas built the bark "Forest Queen" at Port Ludlow, and shortly afterward formed a partnership with William A. Boole, a graduate from the yards of Samuel Hall, the famous clipper-ship builder of Boston.

Mr. Boole had landed in San Francisco in 1853

The steamer "Mexico" was the most pretentious wooden steamer built on the Pacific Coast. This well known craft is shown at the old Pacific Mail wharf.

and, after trying his luck at the mines with poor success, joined the force at the navy yard. The virgin forests of the Northwest appealed to Boole, as they had to most of the early builders, and in the early '70s he visited the sound, where he built the bark "Modoc," at Utsalady, in 1873. Later the firm of Middlemas & Boole entered the shipping business, becoming the managing owners of half a dozen well known deep-water ships, including the New York packets "Kennebec" and "Commodore."

Captain Hans R. Reed (and these were not all courtesy titles in those days), in his narrative in the "Overland" says: "My career as a shipbuilder on the Pacific Coast dates from 1860, when I arrived from my home in Norway and went over to that haven of all my countrymen, Captain North's shipyard at the Potrero." After a few years at the Potrero and several local ventures on his own account, about 1870 Mr. Reed went to Port Madison, Washington, where he helped to swell the output of the Sound yards, and likely enough assisted at the construction of the "Wildwood," built at that place in 1871, the first full-rigged American ship built on the coast. While on the sound, Reed built the "Puritan," the first four-masted schooner on the coast. In 1874 he located at Marshfield, on Coos Bay, and later at Bandon, on the Coquille river. Some of the best known products of Captain Reed's yards were the barkentine "C. C. Funk" and the steam schooners "Dispatch" and "Homer," the latter being still in commission.

Captain Austin Hills began his California career in 1862 as foreman at Captain North's yard. North must have believed that others besires his own countrymen were competent builders, for Hills was a "State o' Mainer." After a few years with North followed by a like period in the same capacity at Owens' yard, Hills made a short visit to his old home, and, just to keep his hand in during his vacation, built a large schooner for the Atlantic Coast trade. Returning to San Francisco, he started a yard of his own, one of his best known works being the Alameda ferry "Encinal," launched in 1883.

In 1870 the Dickie Brothers, who had been shipbuilders in Scotland, came to California and established a yard at South San Francisco, their first work being the revenue cutter "Oliver Wolcott," launched in 1871. This firm soon came to the front as builders of wooden vessels, turning out steamers, steam schooners and whalers. The experience gained in their home yards in Dundee had made these builders well qualified to construct the type of vessel best adapted to the special requirements of Arctic navigation. In 1882 this firm built the propeller "Mexico," by far the largest and most elaborate wooden vessel yet built on the Coast and the first properly equipped passenger steamer of home construction. Her dimensions were: length, 275 feet; beam, 36 feet; depth of hold, 21 feet; gross tonnage, 1797, and horsepower, 1500. The vessel was built in a yard at the foot of Sixteenth street and continued in service for about twenty-five years.

Shortly after the American occupation, the Government, foreseeing the need of a naval base, secured Mare Island for that purpose. In 1852-53 a drydock was brought out in sections from New York, and by the fall of '53, six of these sections having been put in place, the steamer "Pacific" was placed therein for repairs. During the periods of depression incidental to the local demand for bottoms being temporarily supplied, the Government was enabled to secure the services of some of the best mechanics in the country, among them being some of those who later became well known master builders.

Hopkins, in his report to the Underwriters in 1867 on the condition of the shipbuilding industry on the Pacific Coast, said: "There have been about 300 small sailing vessels heretofore constructed on this coast for inland service and short sea voyages, to say nothing of more than 100 steamers." He further states that while early builders were handicapped for want of capital and lack of system, they had proven that vessels could be built fully as cheaply here as in the East.

In 1874 the Board of Marine Underwriters issued a treatise on the subject, in which they advised capitalists to turn their attention to the development of commerce as well as to the exploitation of interior resources, condemning very strongly the shortsighted policy which was responsible for the purchase of old Eastern and foreign-built vessels. They showed that, with the exception of coppering, hulls could be built from 8 to 12 per cent cheaper here than on the Atlantic Coast, the availability of high-grade material being more than sufficient to offset the higher cost of labor.

As showing the class of vessels offered for insurance, a list of San Francisco owned vessels, mostly of foreign build, was cited. In this list, exclusive of steamers and schooners, were 27 ships of an average of 20 years' service, only one of which had a clean A-1 rating, and only five fit to carry grain cargoes. Of 84 barks and barkentines, including 13 new ones built on the Coast and 6 built to order in the East, only 3 rated A-1 clean, and of 34 brigs, of which 7 were Coast built, 9 rated A-1½ or better.

The following tables, taken from these authorities, should prove of interest to modern builders, now that wooden construction is being revived, besides listing the names of a few builders and their works of which no other record can be found. The first table is from "A report to the Marine Underwriters on shipbuilding on the Pacific Coast" by Hopkins and Ringot, 1867, a copy of which, together with the report for 1874 (Table II) is in the Bancroft collection in the University of California Library, possibly the only record of these reports in existence.

Possibly the advice given by the Underwriters may have had some effect upon shipowners, but the introduction of iron into ship construction has been the most important factor in keeping the western forests from being utilized to the best advantage, but there were other uses to which much of the rough lumber shipped to foreign ports might have been put, to the furtherance of our industrial development ashore and afloat.

TABLE I

FROM A LIST OF VESSELS BUILT ON THE COASTS OF CALIFORNIA, OREGON AND WASHINGTON PRIOR TO 1867

Name	Rig	Tons	Cost without copper	Builder	Where built	Date	Material	Fastening	Cost per ton	Rating
Melancthon	bq.	298	$25,000	Simpson	Coos Bay	1867	cedar & pine	iron	$ 84	A2
Hesperian	brig.	241	22,500	Cousins	Humboldt	1865	pine	iron & copper	93	A1½
Arago	brig.	186	13,000	Simpson	Coos Bay	1856	pine	comp. & iron	70	A2
Sarah	sch.	147	14,000	Crowell	Utsalady	1861	pine	iron	95	A2
Tolo	sch.	123	14,300	Thompson	Port Ludlow	1861	pine	iron & comp.	116	A2
Good Templar	sch.	126	11,800	Williamson	Steilacoom	1867	pine	iron-pine tree	94	A2½
Advance	sch.	205	20,000	Howlett	Coos Bay	1862	pine	iron, copper-	97	A1½
Mendocino	sch.	92	9,000	Stephenson	Coos Bay	1860	pine	pine tree nails	98	A2
Fanny	sch.	167	13,000	Mingo	San Fran.	1866	teak & oak	iron & copper	78	A1½
Ada May	sch.	84	19,000	Damon	San Fran.	1866	pine	gal. iron-tree	226	A2
Fanny Hare	sch.	163	22,000	John Daly	San Fran.	1866	teak & oak	iron & copper	129	A1
Monitor	sch.	276	22,000	Mingo & Garrison	San Fran.	1861	pine	copper & iron	80	A2
Maggie Johnson	sch.	141	16,000	Bryant & Cummings	Navarro	1866	pine	iron-pine tree	114	A2
Sue Merrill	sch.	148	19,000	Le Balister	Noyo	1866	pine	gal. iron-locust	128	A2
Mary Cleveland	sch.	122	12,000	John Kruse	Umpqua	1861	pine	gal. iron	98	A2
Montana	sch.	92	12,000	Birdsall	Oakland	1866	pine & oak	spikes-pine tree	130	A2½

TABLE II

SHIPBUILDING ON THE PACIFIC COAST 1874, FROM A LIST OF TWENTY-FIVE VESSELS

Name	Rig	Tons	Without copper	With copper	Builder	Where built	Date	Material	Fastenings	Per ton without copper	Per ton with copper	Rating
Wildwood	ship	1100	......	$80,000	Westervelt	Port Madison	1871	fir	iron & cop.	....	$ 73	A1
Occident	bark	297	$23,000	......	Simpson	Coos Bay	1865	fir & lau.	iron	$ 77	....	A2
Monitor	bark	246	......	21,000	Kentfield	San Fran.	1862	fir	gal. iron	....	85	A2
Tidal Wave	bark	603	50,000	......	Bryant	Port Madison	1869	fir	iron & cop.	83	....	A1
Eureka	bark	267	......	30,000	Murray	Eureka, Cal.	1868	fir	iron & cop.	....	112	A1
Forest Queen	bark	511	60,000	......	Middlemas	Port Ludlow	1870	fir	iron	117	....	A1
Modoc	bark	452	45,000	......	Boole	Utsalady	1873	fir	gal. iron	99	....	A1
Ocean Pearl	sch.	200	20,000	......	Kennedy	Navarro	1868	fir	iron & cop.	100	....	A1½
Jas. Townsend	sch.	160	17,000	......	Peterson	Noyo	1869	fir	gal. iron	100	....	A1½
Aurora	sch.	193	22,000	......	Bendixen	Eureka	1873	fir & lau.	gal. iron	....	125	A1½
N. L. Drew	sch.	120	30,000	......	Nichols	San Fran.	1869	fir & lau.	gal. iron	....	150	A1½

Nevertheless, we have a goodly fleet of home-built vessels, and, to again quote from the report of 1874: "But within the last decade, several hundred small vessels have been built on this Coast of such model, material, strength, durability and sailing qualities as have completely set at rest all doubts as to our capacity to build sailing vessels of any class in competition with any other American port."

While we have only added three full rigged ships to the American merchant marine, yet the productions of Hall's, Bendixen's and other yards, schooners of from 500 to 1000 tons, are, insofar as the hulls are concerned, amongst the most graceful as well as serviceable creations that ever sailed the seas. These vessels, known in every port and roadstead on all the shores of the Pacific, have faithfully "done their bit" towards keeping the United States on the maritime map of the world. Another type of vessel, if not entirely a Pacific Coast creation, has here been brought to a degree of perfection, due to the lumber industry, never reached elsewhere. If "the liner she's a lady," then the steam schooner it's a mule, for as its prototype from Missouri is a drudge on the land, so this marine hybrid is the hardest worked vessel that plows the seas.

With the shipbuilding industry confined to approximately a thousand miles of coast from Burrards Inlet to San Pedro, on an unbroken shore line extending practically from Pole to Pole, and the highways of the seas becoming more and more necessary to our complex civilization, it needs not any prophet to foretell an undreamed of development due to making the best use of our maritime advantages. Subsidy might help to foster the growth of a merchant marine. Charter is a more potent and certain force, and in the light of past experiences, it does seem rather strange that much of the products of our yards should be for foreign owners while we need ships ourselves. It will not make a very good argument for subsidies in the future when it is remembered that owners did not avail themselves to the full of the advantages of to-day. If the policy of buying foreign ships was detrimental in the past, selling to foreign owners during the present crisis, appears to me at least, as not being in the best interests of our maritime development. However, I suppose we may as well accept, in the usual care-free Western manner, such gifts as the gods care to offer and do the "hollering" later.

But, without knowing all the circumstances, criticism may be unjust, and we have a record withal of which we may well be proud. While an even century has elapsed since the first white man's boat was launched on the shores of the Golden Gate, yet the growth of the industry to date has been encompassed within the natural span of a human lifetime. From Chief Marin's tule canoe to the 17,000 ton steamship "Maui," recently launched at the Union Iron Works, is but a brief space as time is reckoned, but with all the intermediary craft including hydroplanes and submersibles, wings and fins, built during that brief period, we may credit our builders with a record of unparalleled achievement and in honoring those for whom we hold gala days we should not forget to pay tribute to the pioneer shipbuilders of the Pacific.

[Note.—Works consulted and quoted in the compilation of the "Early Shipbuilding" articles: Meare's, Vancouver's and Lisianski's "Voyages"; Bancroft's, Hittell's and Eldredge's "Histories"; reports and documents in the Terr Library and records in the Custom House at Juneau, Alaska; Lewis and Dryden's "Marine History of the Pacific Northwest"; Clarke's "Early Days of Oregon History"; Irving's "Biography"; "History of Humboldt County"; "The Annals of San Francisco"; Underwriters' reports, 1867 and 1874; Young's "San Francisco"; "The Overland Monthly" and early San Francisco newspapers. I wish also to extend my thanks for the use of photographs and data to Captain J. W. Troup, Victoria, B. C.; Mr. C. L. Andrews, of Seattle; Mr. Victor H. Elfendahl, of Port Blakely; Mr. George Kellog, of Eureka; Mr. F. C. Matthews, of San Francisco, and Mr. Herbert I. Priestly, of Berkeley.—J. W.]

OLD TUG RENEWS LIFE

An interesting bit of history is recalled by the recent purchase of the old side-wheel tug "Tiger" by George A. Renner, for the sum of $35, who promptly removed the boiler from the sunken hull and sold it for $2400, the boiler being of copper. The "Tiger" was used as a tug by the old Donahue Line and from this concern came into the possession of the Northwestern Pacific Railway. She was sunk in 1909 near McNear's Point and has lain in the mud ever since. The hull has been found in good condition and it looks as if the old craft will be re-engined and have a new lease of life.

The "Tiger" was built in 1875 by Dickie Brothers on Mission bay. The exact site of her building was where the Santa Fe roundhouse now stands, or about one mile inland from the present waterfront. Boats that were built on Mission bay were taken through a draw in long bridge, which all old San Franciscans will remember. The site of this bridge was eventually filled in to form Kentucky street.

The engines for the "Tiger" were designed by G. W. Dickie and built by the old Risdon Iron Works. The cylinders were 15 and 28 inches in diameter and the stroke was 60 inches. The cylinders were set on top of the condenser and the engine exhausted straight down. She was fitted with the first feathering paddle-wheels to appear on San Francisco bay, and for over thirty years Dennis Gorman, one of the best known of the older marine engineers on the bay, was in charge of her engine-room.

Shipping Men to Co-operate

On May 28 an important meeting was held in the Chamber of Commerce in San Francisco, its purpose being to organize the shipping interests in such a way as to best co-operate with the Government in utilizing the merchant marine of the country in the most efficient and helpful manner. The list of delegates to the meeting was as follows:

Representing San Francisco Chamber of Commerce—C. W. Cook, American-Hawaiian S. S. Co.; J. R. Hanify, J. R. Hanify Co.; R. C. Reid, Balfour, Guthrie & Co.; J. C. Rohlfs, Standard Oil Co.; E. G. Ford, W. R. Grace & Co.

Oakland Chamber of Commerce and Commercial Club—J. R. Christy, John Scott, Moore & Scott Iron Works; D. J. Hanlon, H. A. Lafler, Jos. E. Caine, managing director, Oakland Chamber of Commerce.

Los Angeles Chamber of Commerce—L. D. Sale, president Los Angeles Chamber; John S. Mitchell and Nelson Rhoades.

San Diego Chamber of Commerce—W. S. Dorland, president San Diego Chamber of Commerce, and W. B. Frisbie.

Portland Chamber of Commerce—H. L. Corbet, president Portland Chamber of Commerce; O. M. Clark, and D. C. Creilly.

Tacoma Commercial Club and Chamber of Commerce—Gen. James H. Ashton and W. E. Hacker.

Seattle Chamber of Commerce and Commercial Club—J. T. Hefferman, president Hefferman Engine Works; A. F. Hains, manager Pacific S. S. Co.; William Pigott, vice-president Pacific Coast Steel Co. and president Seattle Car & Foundry Co.; Capt. J. S. Gibson, president Washington Stevedore Co. and president International Stevedore Co.; S. H. Hedges, president Puget Sound Bridge & Dredging Co. and president Washington Shipping Corporation; G. C. Corbaley, secretary Seattle Chamber.

Astoria Chamber of Commerce—C. B. Johnson, Great Northern Pacific Steamship Co.

Richmond Chamber of Commerce—Judge D. J. Hall, C. R. Blake, C. G. Bacon, W. W. Cottingham, E. M. Downer; J. C. Owens, president Richmond Chamber; J. A. Long, secretary Richmond Chamber.

Aberdeen Chamber of Commerce—E. A. Christenson.

Alameda Chamber of Commerce—Geo. H. Hagy, John D. Doward.

At the meeting a committee was appointed to formulate a resolution embodying the object of the organization. This committee was composed of J. C. Caine of Oakland, G. C. Corbaley of Seattle, W. S. Dorland of San Diego, John Mitchell of Los Angeles, and J. C. Rohlfs of San Francisco, and prepared the following resolution:

"Recognizing that the world war has imposed upon the President and our Government the problem of providing immediately a great American Merchant Marine for service in overseas commerce, and that the United States Shipping Board and the United States Council of National Defense are undertaking the solution of this problem, not only to meet the emergency of today but also to provide a permanent American Merchant Marine for service in the equally critical commercial conditions that will follow the close of the war, and that the success of this work is not only essential to the efforts of the Allies to end the war and thus remove the menace that threatens the lives of our manhood, but is also vital to the permanent prosperity of all our people having agricultural and industrial products to sell in the markets of the world;

"Therefore, it is the sense of this meeting that we, the Associated Chambers of Commerce of the Pacific Coast, representing the united commercial interests on the Pacific Coast, offer our help and pledge the earnest co-operation of our organizations to the United States Shipping Board and the United States Council of National Defense in working out these problems;

"That, for the purpose of extending such help, we recommend that the president of the Associated Chambers of Commerce of the Pacific Coast appoint a committee of not less than fifteen representative men from the membership of the Associated Chambers of Commerce of the Pacific Coast, who shall be authorized and instructed to co-operate with the United States Shipping Board and the United States Council of National Defense; that this committee be especially asked to develop plans that will bring together similar group meetings of business associations in the Gulf States, on the Atlantic Coast, and in all parts of the United States in order that these arms of our national government may have the fullest possible co-operation of business men in all parts of the country and that every help may be extended to them, not only in meeting the present emergency, but also in providing the permanent merchant marine essential to the overseas commerce of the United States."

In accordance with this resolution, Mr. Koster appointed a committee consisting of J. C. Rohlfs, J. A. McGregor and C. W. Cook of San Francisco; Captain J. S. Gibson, J. E. Chilberg and William Pigott of Seattle; Charles H. Hyde of Tacoma; J.

J. Donovan of Bellingham; J. H. King of Oakland; John S. Mitchell and F. L. Baker of Los Angeles, and E. E. White of San Diego.

Mr. J. C. Rohlfs was appointed as Chairman of this committee and he will leave San Francisco for Seattle on July 2 to call a meeting of the committee, which is termed the Maritime Committee of the Associated Chambers of Commerce of the Pacific Coast. The results of this meeting will be found in the August issue of the "Pacific Marine Review."

It is the hope of the Maritime Committee that the Shipping Board will avail itself fully of the service of shipping men and that the committee will be of no little assistance in solving the great maritime problems which confront the country. The American merchant marine idea will be held steadily in view by the committee, which will seek to impress the country with the necessity of keeping our rapidly increasing merchant fleet intact after the war so that America will permanently resume her rightful place on the ocean.

OUR SCHOOL SHIPS

Now that the States of Washington and California are to have school ships, the question naturally arises as to the sufficiency of the American school ship as an educational institution for modern ship masters. That cruising about the world in a vessel like the old St. Marys and receiving instructions from carefully selected officers in nearly all branches of seamanship is both a splendid experience and a splendid education for any young man goes without saying, but, nevertheless, this training has one serious deficiency.

The captain of a modern steamer, in over ninety cases out of a hundred, is engaged in the transportation of freight. Navigation, ship handling, provisioning and caring for his crew are just as important today as they ever were. The business connected with port clearances, dues and fines, etc., may be clearly demonstrated on one ship as well as another, but the usual type of school ship presents no opportunity for practical instruction in the art of stowing a ship's cargo.

Cargo stowage is of prime importance. The disposal of cargo and the distribution of weights affect the vessel's stability, and the results of too much stability are sometimes as bad as the damages caused by too little of it. Aside from the paramount demand that the cargo be stowed in such manner as to render the craft seaworthy, there is also the question of proper stowage to insure the cargo itself from damage incidental to cases, boxes, and barrels shifting and working among themselves. These are matters knowledge of which marks the successful from the unsuccessful captain of today. The practical side of loading a vessel cannot be demonstrated on the usual type of craft delegated by the Government as a school ship, however, and this fault is perhaps the greatest single drawback to the school-ship system of the United States today.

The school ship, on her long voyages, is essentially a tramp ship, and it is difficult to see why such a vessel could not be of a modern type—something nearer to the ships which its graduates will be called upon to officer—and pick up freights of as varied a character as possible; thus, while neglecting none of the things now taught on our school ships, including a practical course in cargo stowage and the art of properly loading a ship. While a school ship working in this way could never hope to pay her way, still she would materially lessen the cost of her upkeep and would turn out men better fitted to step directly into the command of ocean freighters.

G. M. McDOWELL RETIRES

One of the most interesting announcements during June was that of the retirement of Mr. George M. McDowell as Northwest Manager for A. O. Andersen & Company. Mr. McDowell joined the Andersen forces about two years ago, previous to that time having been Portland manager for W. R. Grace & Company. As manager of the Andersen interests, Mr. McDowell was in charge of the McEachern Shipbuilding Company at Astoria as well as of the chartering and cargo procuring and handling business of the great New York and European shipping firm.

It is understood that the McEachern Shipbuilding Company property has been acquired by M. H. Houser of Portland.

While several large Seattle concerns have been endeavoring to secure the services of Mr. McDowell, he has decided to enjoy a well earned vacation before getting into business harness once more.

The Hesse-Martin Iron Works has purchased the block bounded by East Eighth, East Ninth, East Salmon and East Taylor streets in Portland and will start large additions to their present plant on this property.

On June 12 and 13 there was a convention of the Pacific Coast Maritime Association, comprising metal workers engaged in the building of marine machinery, at Portland. Delegates were present from all the seaport towns from Victoria to San Diego. Mr. A. L. Miller of Seattle was chosen President, Joseph Reed of Portland Vice-President and P. W. Wilson of Vancouver, B. C., Secretary.

Torsion in Ships

THIS strain, only too frequently ignored by otherwise careful naval architects and ship builders, is the bane of the wooden ship. Torsion strains act in the outer skin of a ship, in lines running at 45 degrees from wales to bilge, from bilge to keel and in the upper decks from water-ways to midship. In most wooden ships there is but scant provision made to meet them. The outer skin and the deck planking run fore and aft in narrow widths with calking of some kind separating each plank from its fellow. The ship's frame or timbers lie at right angles to the planking, so there is no diagonal continuity to the material constituting the skin of the ship. A metal ship does not suffer in this respect like the wooden ship, since its skin has diagonal continuity. Supposing, just for a moment, that metal ships were built with long narrow strips of metal constituting the skin secured by rivets or bolts to the frames, but unsecured to one another, the joints of these narrow metallic strips, being kept water tight by some kind of calking or packing hammered in between them; such a metal ship would leak like a sieve as soon as launched. It is easy to perceive that the riveting together of the longitudinal edges of the plates that go to make up the skin and decks of a metal ship furnishes just that diagonal continuity that is wholly lacking in the wooden ship as ordinarily constructed without diagonal strapping (called "riders") or its planking laid on in courses, two courses running at 45 degrees from wales to bilge and from bilge to keel, crossing each other at 90 degrees, and an outer course running fore and aft in the usual manner. Of the two ways of securing diagonal continuity of skin the 45 degree layers of planking are better than the diagonal metallic strapping, since three courses of planking so laid on constitute a homogeneous structure. A fine, durable construction may be made out of a proper combination of wood and metal, but it can never be homogeneous. The modulii of elasticity for wood and any metal are so far apart, when strains become severe they cease to help one another. When rider plates are used they should be designed to take care of the whole of the torsion strain, not asking for any help in that particular direction from the wooden planking. In the case of a sailing vessel, most any one familiar with the maneuver of "wear ship," would recognize that the pressure of the jibs and fore-sails, acting on the fore-mast alone, would tend to twist the hull, likewise when "coming about" pressure of the wind on the mizzen or aft canvas in one direction and on the head sails in the opposite direction must do the same thing. The accompanying illustration will serve, however, to show that a ship may be, and is, severely strained by twisting and wrenching if she be a long vessel when she is sailing diagonally across seas. In that case, as an inspection of the cut will show, the forward end of the ship is trying to set its mast at right angles with the surface of the wave slope it is entering, while the after end of the ship is trying to set its mast at right angles with the surface of the slope of the wave it is leaving, and this twist first in one direction and then in the other goes on continuously as long as the ship's course lies at an angle with the swells of the ocean or sea it is crossing. It should be noted that the use of courses of 45-degree planking or diagonal strapping provides for the serious shearing strain that accompanies "hogging" or "sagging" strains, though it is possible to provide against the latter by the introduction of a longitudinal truss (generally in the form of a Warren or Linville girder) as a longitudinal bulkhead. It is just as well to point out that a ship's hull might be full of transverse bulkheads and have a longitudinal bulkhead incorporated with the same and yet be weak to resist wrenching and twisting; nothing is so important in that respect as diagonal continuity of skin. The fact that shearing strains are equally well taken care of in this manner, as well as the torsion strains, is a good and sufficient reason why all large wooden ships should be provided with either three courses of outer planking, two at 45 degrees and one running fore and aft, all three properly fastened to one another as well as to the timbers of the frame; or a complete network of diagonal strapping. There have been teak-built and live-oak-built ships that have lasted for sixty, eighty and even one hundred years. These wooden vessels were all of them moderate size compared with the modern freight carrier, but their long, useful lives serve to show that wood is not necessarily a perishable material. Skilfully designed and skilfully put together, of carefully selected timber, vastly larger wooden ships than any that have ever sailed the seven seas can be built. The justification for their construction is purely an economic one. Granted that the steel ship is in every way preferable, nevertheless if we can't keep up with the demands for freight carriers, not only now, but in the next four or five years to come, we had better not only speed up our steel building shipyards to the limit, but also supplement their utmost possible output with as many large wooden ships as we can possibly find help and suitable timber to build. One year's good service, under existing conditions as to freight rates and the necessities of our friends on the other side of the ocean, would justify the construction of any vessel, even if at the end of that year her fate were to be "rotten row."—John L. Bogert.

Panorama of Stone's yard showing four South Sea trading schooners under way at once. This view was taken from the deck of a yacht that had just been converted to a South Sea trader.

On the Oakland Estuary

INDUSTRIALLY the Oakland Estuary district has been making remarkable strides during the past few years and in no industries has this advance been more marked than in the shipyards and engine building plants. New concerns have sprung into being and are rapidly bringing about the realization of pretentious programs of improvement and construction. The fortunate combination of rail and water facilities has resulted in gradually lining both sides of the estuary with plants and all of these concerns are notably busy at the present time.

The Atlas Imperial Engine Company

This concern, which manufactures Atlas and Imperial gas engines ranging from 4 to 250 horse power units and Atlas full Diesel engines from 110 to 1200 horse power in capacity, has been making every effort to fill the demands of its selling agents. Despite the difficulty in obtaining materials and the tendency of foundries to deliver orders in bulk rather than as needed, the Atlas Imperial management has succeeded in keeping two shifts a day working in their shops. The great mass of work ahead of this concern includes many Diesel engines.

South Sea Traders

The W. F. Stone yard presents an unusually busy appearance these days with four sizeable schooners on the ways all in frame. Three of these boats are 117 feet long by 28 feet beam by 11 feet depth of hold and are for the South Seas trade of the Burns-Philip Company of Australia. They will be powered with 125 horse power gasoline engines. The fourth boat is for Atkins & Kroll and is an auxiliary schooner 176 feet long, 38 feet beam and 14 feet 6 inches depth of hold. This schooner will have twin 110 horse power gas engines.

Another job at the Stone yard which is creating more than usual interest is the transformation of the fine yachts "Seafarer" and "Marian" into South Sea traders. These handsome schooners were purchased by Atkins & Kroll and have had their hardwood cabins torn out, officers' and crews' quarters arranged for, top-masts removed and the Marian is having a 35 horse power Union gas engine installed—the Seafarer being already fitted with auxiliary power. These two schooners will doubtless prove fast and economical carriers of copra. Rapid work is the order of the day at Stone's, the yard being fortunate enough to have practically all the material on hand that is needed for the four vessels now building.

Big Oil Engine on the Test Stand

The Standard Gas Engine Company's shops are very much crowded with work at the present time, among the interesting engines on the floor being a 240 horse power Southwark-Harris Diesel, which is being put through exhaustive tests before shipment. A further object of interest to the visitor is the large number of engines being crated for export shipment. Notable among these engines was the large number of crates marked for Callao and other South American ports.

Like other concerns, the Standard is feeling the effects of the war upon its management. Already Mr. John H. Clayton, one of the best known engine building company executives on the coast, has entered the country's service in the aviation corps. Mr. Clayton has won himself a host of friends up and down the coast who are wishing him godspeed on his patriotic venture.

Big Improvement Under Way

The Hanlon yard is in the process of a metamorphosis from a wooden shipbuilding plant to a yard for both steel and wooden construction. Filling and piling for the new plate shop and the building ways for steel vessels is now about complete and the plans for the new plant have been carefully worked out with a view to utilizing the space available to the very best advantage. Mr. Hanlon made a careful personal study of shipyards, both East and West, before deciding on his final arrangement and it is interesting to note that he has departed from the orthodox methods in several instances. In this regard, however, it will be recalled that he was the first to try out the Bolinder engine on San Francisco bay and he also departed from the usual wooden shipyard practice of using waste wood and shavings under a boiler to furnish steam power and installed a powerful electric motor for hauling in his marine railway.

Two building berths will be installed for steel ships and these will be designed with a view to easy extension in case of vessels of great length being contracted for. The aerial hoist system will be employed for handling material, the trolleys leading down each side of each building slip. The new plate shop, 200 by 80 feet in size, will be adjacent to the head of the slip and a cross trolley will serve to transfer material from the plate yard to the slips.

There is always to be found a large amount of interesting repair work at the Hanlon yard. The "Fair Oaks" is at present having her topsides renewed and the old schooner "Planter" has been completely rebuilt and renewed until today she is as spick and span a craft as one would wish to meet up with and her owners refer to her as "the yacht."

Engine Popular in South Pacific

One of the most interesting developments in the shipbuilding industry about San Francisco bay has been the building of the staunch South Sea Island trading schooners. We have already referred to the schooners building at W. F. Stone's yard and it is worthy of note that the four schooners building at this plant and the two yachts being converted to traders will all be auxiliary powered with Union gas engines. The three schooners for Burns, Philip & Company Ltd. of Sydney, which are 117 feet in length by 27 feet beam by 11 feet moulded depth and which have a capacity of 150 tons of copra, will be powered with 110 horse power, three-cylinder, open cross-head marine kerosene Union engines. Similar vessels now being constructed in Australia for the same concern will also be powered with Union engines. The three vessels building at Stone's are being constructed in the main of Oregon pine and will be copper sheathed.

The fourth vessel is for Atkins & Kroll of San Francisco and is considerably larger, having a cargo capacity of 500 tons and being 175 feet over all, 38 feet 1 inch beam and 14 feet 6 inches moulded depth. She will be equipped with twin 110 horse power Union three-cylinder, open crosshead engines equipped to burn kerosene.

The two yachts which are being converted to South Sea traders are the "Seafarer" and "Marian," both well known in coast yachting circles. The "Marian" was formerly without power and her new owners, Atkins & Kroll, are having a 35 horse power three-cylinder Union engine installed. The "Seafarer" was owned by L. A. Norris of San Francisco and she had a Union engine installed six or seven years ago. This engine, after a slight overhauling, was found all ready for the severe service that a South Sea trader is put to.

The wide use of the Union gas engine in the South Seas is due to the ability of this engine to stand up under difficult conditions, its low upkeep cost and the splendid success that has been obtained in using kerosene in this design of engine.

Steel Shipbuilding Plant Busy

No plant along the estuary shows a greater degree of activity than that of the Moore & Scott Iron Works. The big tanker "Frederick R. Kellogg" is at the fitting out wharf receiving her finishing touches. The "Kellog" is being built to the order of the Pan-American Petroleum Company and is 425 feet long, 57 feet beam and 33 feet moulded depth. She is driven by a Curtis-General Electric geared turbine of 2600 horse power, steam being supplied by three Scotch boilers. Three freighters are on the ways, one being completely framed, and other freighters will replace these as fast as the ways can be vacated.

The Moore & Scott plant is utilizing every inch of space at its disposal and the carefully planned arrangement permits of a maximum output of work. The revolving crane over the outside fabricating and storage space with the independent jibs on each of its four supporting columns is proving to be a splendid bit of handling mechanism, while an inspection of the steel work being turned out will show that this yard is setting a high standard of excellence in workmanship.

ABERDEEN YARD PURCHASED

Andrew Peterson, President and sole proprietor of the Aberdeen shipyard, sold the plant during the past month to Grant, Smith & Company. The Peterson yard has at present four ways and four ships under construction, all of which are near completion. In addition to purchasing the shipyard, Grant, Smith & Company secured options on additional property with a view to extending the plant. The output of the Aberdeen yard for 1916 included the "Idaho," the "Oregon," the "Phyllis" and the "Columbia River." Mr. Andrew Peterson, who is widely known as one of the master wooden shipbuilders of the Pacific Coast, will remain with the new owners for a term of years as yard manager.

New Grain Handling Plant

By G. B. Hegardt, Am. Soc. C. E.

THE handling of wheat in sacks rather than in bulk has been one of the distinguishing features of the Pacific Coast and this method has been practiced since wheat was first raised in this section of the country. The means of transportation then available—wagon or river steamer—made it necessary that grain be handled from the producing territory to tidewater in some sort of container. Under these conditions, the wheat had to be sacked on the farm, and that practice has come down through all the intervening years.

Sack handling also became a necessity because of the conditions under which grain was transported on the Pacific ocean. The grain crop for many years was nearly exclusively exported in sailing vessels to Europe around the Horn, the average vessel requiring four to five months to make the trip, crossing the equator twice and in the interval going through a temperature almost frigid. Grain in bulk was more liable to heat than grain in sacks. The grain then went in full cargoes, and in bulk the danger from shifting of cargo with roll of the vessel was a serious matter.

When, in more recent years, steamers began to encroach on the wheat export business, there was no change in the method of carrying wheat around the Horn, notwithstanding the time of the passage was cut, practically, in two.

Because first of slides, and later because of war conditions, the Panama Canal has not had a controlling influence in changing the method of shipping wheat from the Pacific Coast to the Atlantic Coast or to Europe.

So far as known, the only attempt to ship wheat in bulk from the Pacific Coast to Europe around the Horn was made some 25 to 30 years ago. Three sailing vessels, it is understood, were then dispatched, loaded two-thirds bulk and one-third sacked wheat, and though great care was used in loading, not one of the cargoes are said to have reached destination in good conditions.

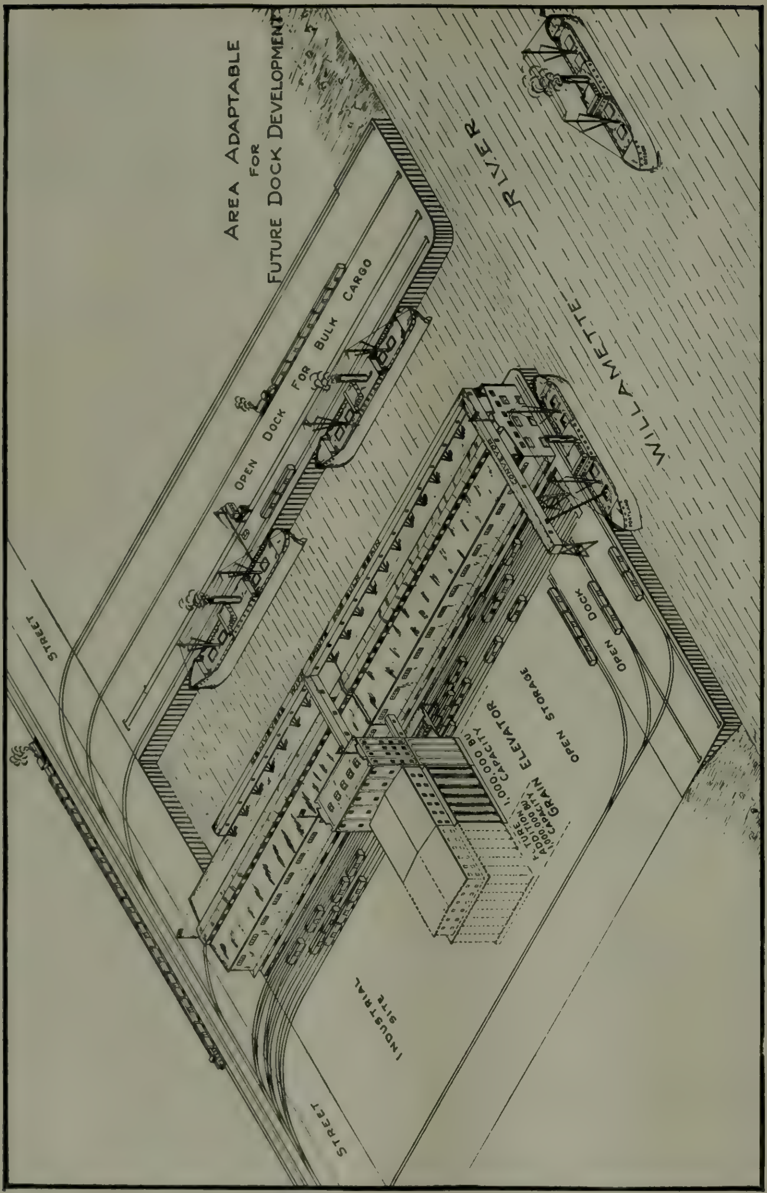
During the last three or four years, however, and in anticipation of the opening of the Panama Canal for traffic in 1915, there has been a steadily growing desire among the farmers of the wheat producing sections of the Pacific Northwest to get to the bulk system of handling their grain, as is being now done from nearly all parts of the world, Australia being the most important exception.

While bulk handling has been practiced in the Inland Empire—Oregon, Washington and Idaho—to a limited extent for several years, it is only during 1915 and 1916 that this movement has assumed definite shape, and a very concerted action of co-operation started on the part of the farmers to approach the problem in a systematic and practical way, and at the present time, interior elevator construction is well under way. Although only a start has been made in this direction, considering the large territory involved, it is the first time the bulk handling of wheat has had so uniform a backing of the growers.

About two years ago, the Commission of Public Docks of the City of Portland, Oregon, first took up the question of providing bulk elevator facilities for this port, and at that time prepared tentative plans for such equipment; but after consultation with exporters and others, it was decided that the time was not then opportune for such construction. But, with the rapid strides which the farmers, in the last two years, have made in preparing to handle their wheat in bulk from the field to tidewater, the Commission of Public Docks, after a thorough investigation of the bulk handling movement last fall, readily came to the conclusion that it was of a permanent nature and would be put into operation as fast as facilities in the interior could be provided.

The Commission, therefore, in order to care for and protect the port's export wheat trade, went before the people at the general municipal election held June 4, 1917, asking for authority to issue and sell bonds in the amount of $3,000,000, for the purpose of providing elevator and other port facilities for handling wheat in bulk and other freight. This bond measure carried by a very large majority.

The terminal development shown on the accompanying aeroplane drawing illustrates the elevator facilities which are proposed for this port to furnish the means for the expeditious and economical handling of grain in bulk, and it also provides certain other facilities for the handling and storing of


AREA ADAPTABLE FOR FUTURE DOCK DEVELOPMENT
WILLAMETTE RIVER
OPEN DOCK FOR BULK CARGO
STREET
OPEN DOCK
OPEN STORAGE
GRAIN ELEVATOR 1,000,000 BU. CAPACITY
FUTURE ADDITION 1,000,000 BU. CAPACITY
INDUSTRIAL SITE
STREET

Portland's proposed new elevator facilities. The great grain port of the Northwest is making every effort to have its new grain-handling machinery in operation to handle the 1918 crops.

lumber, steel rails, structural steel, soya bean oil, and other bulk material and freight for which the accommodations now available are rather limited.

Referring in detail to the terminal layout of the particular facilities it is proposed to provide with funds now available for the handling and storing of grain in bulk, and such other articles of commerce as are outlined above, the plan shows the elevator with necessary trackage, a two-story shed or warehouse about 175 feet in width and, across the slip, an open dock.

The elevator is of a capacity of 1,000,000 bushels, as a first unit, with space and connections arranged to increase the bin storage to 2,000,000 bushels, when the necessity for such increase later arrives. The head or working house will, at this time, be built to take care of the larger capacity storage.

The elevator will be a combined bulk and sack elevator, and enables grain to be shipped by either method, as requirements may demand. It will be a modern, fire-proof, re-inforced concrete structure, costing approximately $900,000.00.

For grain which is not to be stored or shipped in bulk, there will be provided automatic sackers. The sacked grain will be carried by suitable flat-belt conveyors to the dockshed or warehouse and, with grain which will be received in sacks from the interior and is not for bulking in the elevator, will there be stored ready for shipment.

The shed or warehouse, in addition to the uses already mentioned, will serve the purpose of taking care of inbound general cargo, or cargo to be assembled, in case of congestion on the other municipal docks.

The slip will be of ample width not only to accommodate the berthed vessels, but will also permit of coaling and other barges to tie up alongside the vessels moored on both sides of the slip, which will be dredged to a depth of 30 feet or more at low water.

Across the slip will be constructed an open dock, with filled ground in rear, with adequate rail and crane trackage to furnish efficient handling and loading facilities, with the view of giving the best possible dispatch to vessels taking on or discharging cargoes of special commodities.

It is proposed to make the slip and piers 1000 to 1200 feet long, depending upon the depth of the property which may be acquired for this terminal, so that two ordinary sized vessels may be berthed at one time on each side of the slip.

This terminal has been carefully planned for future enlargement and the furnishing of additional and greatly increased shed and cargo handling facilities, at a comparatively small cost, as compared with new and separate port development. The furnishing of additional covered storage space for the accommodation of general cargo movements may be readily effected in a very short time by the construction of a transit shed, either on the open dock across the slip or on that portion of the open dock lying along the harbor line in front of the elevator, as the sub-structure in either case will already be in place.

The terminal development shown is applicable to several sites in the harbor, and it will be located below the bridges. It is expected that the cost of the immediate construction, including the site, will be in the neighborhood of $2,000,000, and that the elevator with its accessories will be completed in time for the 1918 wheat crop.

With funds previously at the disposal of the Commission of Public Docks, there has been already provided modern port facilities and at this time the city has three municipally owned docks with a total frontage of 2505 lineal feet, and two warehouses.

With the $3,000,000 appropriation now made available, berthing space for six vessels 500 feet long will be provided, and the new terminal will be equipped with sheerlegs, gantry and locomotive cranes, in addition to electric trucks, electric winches and conveyors.

The Columbia River Jetties

IN May of this year Major Henry C. Jewett, in charge of the United States Government work for the improvement of the mouth of the Columbia river, announced the completion of the north jetty after it had been built to sea two and one-half miles on the north side of the entrance to the Columbia river.

In 1914 the south jetty was completed a distance of 7½ miles from the mainland. The outer ends of the two jetties are a little over two miles apart. These jetties are known as midtide jetties, built up to a level that they will not overflow except at a midtide stage of the ocean. The purpose of limiting the height of construction to this stage was to permit of the basin within filling completely at high tide. In the outflow of the water, impounded during high tide, it has been found that during the stage of ebb down to midtide there is relatively little scouring, as the current does not reach a sufficient velocity. From midtide to low tide the scour occurs. By having the jetties at midtide level, the full force of the discharging waters is confined to the area where the scour is desired.

An expenditure of about $16,000,000 has been made by the federal government in constructing the south and the north jetties at the Columbia. Results have been revolutionary in their character. What was known as the Columbia River bar, so far as the channel goes, has been practically eliminated. Local people insist that there is no more bar for shipping.

At the beginning of the jetty construction depths of water in the various channels that formed across the Columbia River bar became as low as nineteen and twenty feet at different periods and shifted in the more violent storms of winter. For more than three years the channel has been maintained on one line without difficulty whatever through the control of the currents, influenced by the jetties. For more than one year the depth of water at mean lower low level has been 40 feet, giving an average of 47.5 feet at average tide. It is found that the 50-foot contours, both inside and outside, of the original bar area, are rapidly approaching in the channel region, and by a limited amount of dredging confidence is expressed by those familiar with the work, and who have made years of study of the same, that depths of water above 45 feet at mean lower low level are possible and will very probably be attained in the not distant future. By rather vigorous dredging for the available season it has been stated by some experts that a depth of 50 feet at mean lower low level could be had, or 57.5 feet at average tide.

Since the jetties were completed and deep water established across the channel area, the bar does not break except in the roughest weather and the menace to vessels from this cause has been very largely eliminated. Also, the very greatly increased depth of water under the keels of vessels permits them to move when having a reasonable draft in any kind of a sea without danger of touching bottom. Some of the tankers operating between California and Portland, drawing 26 and 27 feet, enter night or day regardless of weather conditions. A vessel drawing 31′ 2″ passed to sea the present month without any delay whatever. Pilots announce that they would be willing to handle vessels of 32 feet draft across the bar without apprehension.

Portland shipping men regard this the most revolutionary improvement that has ever been accomplished in any harbor improvement plan on the American continent. It is a work that was fraught with very great difficulty because of the fact that the jetties had to be constructed straight out to sea, where the full force of the storm waves of the Pacific struck unbroken. Thus the work became one of the greatest engineering difficulties and was attended by many delays that were not anticipated at the commencement. For many years after the south jetty was under progress there were grave doubts in the minds of many engineers of the country, and shipping men, that any substantial or permanent results would be attained. All these doubts have been dissipated in the minds of those who are intimately familiar with conditions as they exist today. Permanency of channel, depths of water and other elements are regarded as fixed quantities and give all the guarantees of safety that can be found among the best harbor entrances of the world.

At the beginning of jetty construction at the mouth of the Columbia River there was a discharge area of 7½ miles in width between Cape Disappointment and Point Adams. When Admiral Vancouver sailed into the mouth of the river more than a century ago and made the first careful soundings of which any records have been kept, the deepest water was found immediately under Cape Disappointment on the north side of the entrance. From this deep channel under the high headland of Cape Disappointment to the sandy shore of Point Adams, seven miles to the south, the channel varied and shifted with winter storms and passing years. The larger area of what was termed by the earlier navigators as the "middle sands" finally formed a spit, running up to Cape Disappointment, that would be dry at low tide.

As the south jetty progressed to seaward a parallel channel of over a mile in width was formed, with a depth of water above 60 feet, sometimes attaining nearly a hundred feet. This deep channel, styled by the engineers "the gorge," has extended steadily seaward until now the 40-foot contour lines inside and outside have about met and a very slight cut was required by the seagoing dredge "Chinook" to bring the 40-foot lines together the past season. This deep water gorge inside pressed seaward over 13,000 feet in two years, following completion of the south jetty, and at no time since any part of the south jetty has been finished has there been any variation except improvement on all of the channel formed parallel to this jetty.

Another fact of the utmost moment, which both engineers and navigators doubted at the beginning, was that the bar, which extended seaward some distance with the construction of the south jetty, has reached a point of rest or stability. As a matter of fact, the portion of the bar remnant crossed by the present main channel has receded from the exterior in the past three years, showing that the littoral currents are sufficient to move whatever debris is carried through the channel to sea by tidal or fresh water currents.

All of the current and channel conditions studied by the engineers lead them to the unalterable conclusion that a state of permanency and fixedness has been attained, which is of the highest moment to all commerce of the Columbia Basin.

The Columbia River Channels

PORTLAND celebrated in a quiet way last month the movement through the harbor and to sea of the deepest draught freighter that has ever taken cargo from the Columbia River port. This was recorded when the War Knight, recently built in San Francisco, took out a cargo of wheat that ran above 12,000 tons.

The War Knight, when ready for sea, drew slightly more than 31 feet. She drew out of the Portland harbor, passed down the Columbia and went to sea without let or hindrance, making the run from Portland to Astoria in slightly less than eight hours. This achievement in a river channel that in past years has been regarded with some concern by shipping men is held by Portland business men as another evidence that the millions spent in harbor and channel improvement has worked wonders for Portland and the Columbia Basin.

The river channel would not in normal condi-

The "War Knight" leaving Portland, Oregon. Without the slightest trouble this vessel navigated the Columbia from Portland to the sea, drawing 31 feet 3 inches of water.

tions be taken by a 31-foot draught vessel so readily as when the War Knight went to sea the current month. The Government engineers and Port of Portland have announced a 30-foot channel at zero stage of the river between Portland and Astoria, with adequate width in the river bar cuts to make navigation free and easy. In June the Columbia is in freshet, giving a depth of 40 feet in all the river bar cuts, with depths ranging from this on up to 100 feet between the 14 river bars on which operations have been conducted in late years. Despite the fact that the river portion of the channel had the benefit of freshet water, Portland shippers maintain that the War Knight is the pioneer of the heavy-draught freighters, which will in coming years not hesitate when not drawing more than 30 feet.

In gaining a zero stage depth of 30 feet in the Columbia and Willamette rivers, the Port of Portland has spent something like $4,500,000, raised by taxation from Portland, and the federal government has spent about $3,500,000. When the river improvement began, the controlling depths were from 15 to 17 feet, and these have steadily been improved until the Portland shipper is ready to insist upon recognition by all except the very deepest draught vessels of the Pacific.

Oregon's State Aid for Shipping

OREGON has adopted an amendment to the State Constitution permitting the levying of a tax or the issuance of bonds by a municipality organized for shipping purposes to aid, through a subsidy, subvention or bonus, private water transportation lines.

This innovation for Western communities is regarded with a great deal of interest by a number of the influential buisness men and shipping concerns of Portland. As to whether or not the power will be exercised depends upon the exigencies of shipping developments in the State. Portland business men are inclined to think that, in the establishment of certain services—coastwise or off-shore, as well as on the interior waterways—the power may be exercised.

By a vote at the June 4th election held in Oregon, the amendment to the Constitution was adopted with a substantial majority, and at the next session of the Legislature it will be the purpose to have adopted an enabling act creating the machinery for carrying this new power into effect.

Oregon already had made considerable progress in the way of State or municipal help in developing shipping lines. The port districts, created in Oregon for channel and harbor improvement work, had been by previous acts of the Legislature given power to build, own and operate steamship and steamboat lines. This power of public ownership and operation has never been exercised. The powers of port districts, which are the municipalities contemplated in the constitutional amendment just adopted, have been devoted in the past to channel and harbor improvements and for providing certain facilities in harbors for steamship accommodations. A movement was inaugurated some time ago to issue a million dollars of bonds by the Port of Portland district, embracing the City of Portland, for the establishment of an Alaska steamer line. Because of certain indefiniteness in the law and also because of certain opposition to municipal or public ownership of a steamer line, this suggestion was not carried out. Since this suggestion was made, the law providing for public ownership has been amended, covering all points in question at the time the suggestion was made and the powers given the port districts have been extended to cover inland waterways as well as coastwise shipping.

Many of the business men of the State, who do not believe in the efficiency of public ownership for steamship operation, made the suggestion that, in view of the fact that Oregon is charged with being rather apathetic in support of water transportation it would be necessary to make the people as a whole support water transportation and to contribute to operating losses through a tax until the necessary business was furnished to make the line a growing success. In reference to this view the amendment to the Constitution just adopted June 4th was submitted to the people. It met the very hearty support of the people at large, especially the producers and manufacturers. It is clear from this vote that Oregon is determined to improve steamship conditions. A mass of the people are willing to give the necessary support. Business men who have suffered from the dearth of shipping accommodations believe that out of this general public support and the arousing of popular interest, there will be a vastly improved condition at such time in the future as war conditions permit of a rational development.

The amendment to the Constitution granting the authority for a subsidy, subvention or bonus, is in the following language:

SENATE JOINT RESOLUTION NO. 13

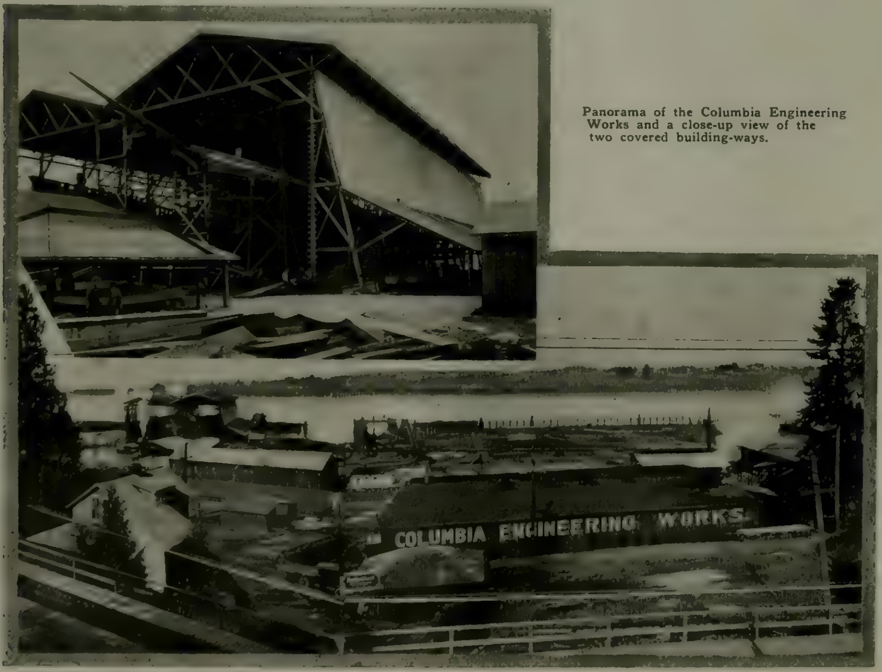
RESOLVED BY THE SENATE AND THE HOUSE OF REPRESENTATIVES JOINTLY CONCURRING:

That Section 9 of Article II of the Constitution of the State of Oregon be and the same is hereby amended to read as follows:

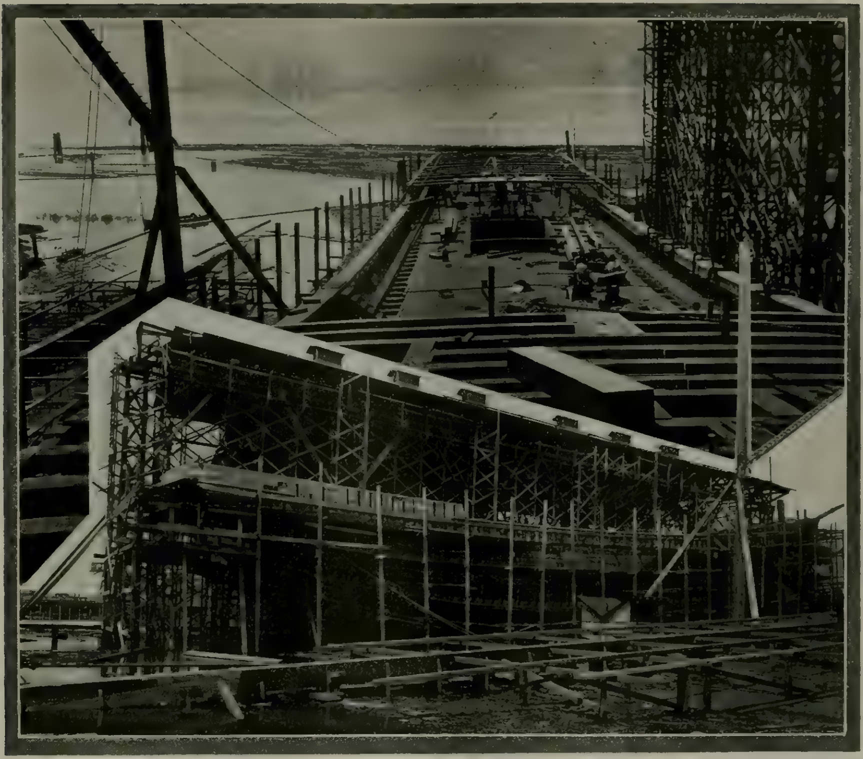
Section 9. No county, city, town or other municipal corporation, by vote of its citizens, or otherwise, shall become a stockholder in any joint company, corporation or association, whatever, or raise money for or loan its credit to or in aid of any such company, corporation or association; provided, that any municipal corporation designated as a port under any general or special law of the State of Oregon, may be empowered by statute to raise money and expend the same in the form of a subsidy or bonus to aid in establishing water transportation lines between such port and any other domestic or foreign port or ports; any debts of a municipality to raise money created for the aforesaid purpose shall be incurred only on approval of a majority of those voting on the question, and shall not either singly or in the aggregate, with previous debts and liabilities incurred for that purpose, exceed one per cent of the assessed valuation of all property in the municipality.

Resolved, That a committee of one Senator and two Representatives be appointed to prepare and file with the Secretary of State, arguments in support of the aforesaid proposed constitutional amendment; and, be it further

Resolved, That the Secretary of State be and he hereby is authorized and directed to set aside two pages in the official pamphlet containing the proposed initiative and referendum measures to be voted upon in the year 1918, in which arguments supporting the proposed constitutional amendment may be printed.



Panorama of the Columbia Engineering Works and a close-up view of the two covered building-ways.



In the Peninsula Shipbuilding Company's yard. Deck and side views of one of the big auxiliary schooners now nearing completion.

PORTLAND YARD FORGING AHEAD

The accompanying pictures illustrate the intense activity in the Peninsula Shipbuilding Company's plant, which is owned by one of the most progressive groups of shipbuilders in a district that is noted for its high-class wooden shipyards.

The vessel shown in the picture outside the covered building-slip is 251 feet 7 inches long over all, 225 feet on keel, 43 feet moulded beam, and 21 feet 6 inches moulded depth. She will be rigged as a four-masted schooner and will be powered with a 600 brake horsepower Winton Diesel engine. The picture was taken in the early part of June and the vessel has now been launched.

In order to appreciate the energy displayed in getting this yard into its present and efficient shape, it should be understood that only last June the site of the plant was a swamp. Dredgers were set to work making a sand fill, and as fast as the dredgers filled one section the slip foundations were decked over and actual shipbuilding commenced. To date the Peninsula yard has put four large wooden hulls into the water, which is truly a splendid showing for a yard but one year old.

Captain Theodore Knudson, one of the leading spirits in the Peninsula Shipbuilding Company management.

The Peninsula Shipbuilding Company accepted a contract for four of the wooden vessels being built by the United States Shipping Board, and the keels for three of these craft are already laid. These vessels are sizable craft, being 281 feet 6 inches long over all, 268 feet between perpendiculars, 46 feet beam over planking, 45 feet 2 inches beam moulded and 26 feet depth moulded. This yard expects to turn out one of the Government standard steamers each four months in addition to taking care of its private contracts and building ships to its own order.

The excellent showing of the Peninsula Shipbuilding Company has been made possible by the carefully planned yard lay-out and the energetic management and confidence in the future of the wooden ship displayed by Captain Theo. Knudson and his confreres.

ASTORIA'S ELEVATORS

Work on the new grain storage and handling plant of the Port of Astoria is progressing rapidly. Sixty-four reinforced-concrete storage bins for bulk wheat are being erected, each bin being 22 feet 8 inches in diameter and 78 feet deep, giving a storage of 1,000,000 bushels. In addition to this, there will be warehouse capacity for 2,000,000 bushels of sacked wheat. The bins have a receiving elevator on each side, each with a capacity of 15,000 bushels per hour. A 36-inch conveyor will be used for filling the bins, and this conveyor will extend into the present workhouse, connecting the old storage facilities with the new. The conveyor-belts runs through reversible trippers, discharging into the various bins. Under the bins, in tunnels, are four 36-inch conveyor-belts which discharge at the elevators for shipping out or rehandling. Two 2000-bushel garners receive the grain from the elevators and discharge to two 1600-bushel hopper scales, which in turn discharge to the workhouse bins. A 36-inch belt conveys grain for shipment to slip No. 1 on the waterfront, and a 30-inch conveyor performs a like service for the sacked grain.

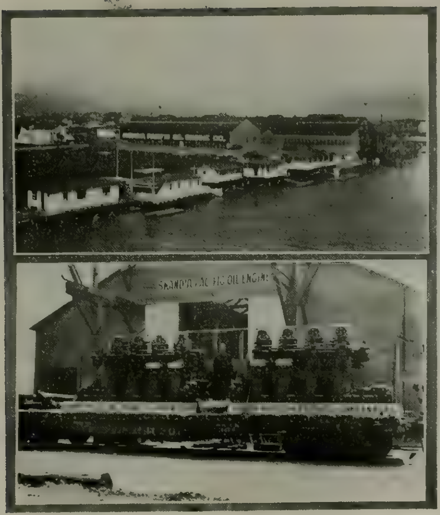
An Agreement of International Importance

REALIZING the great immediate future that there is for the true Diesel marine engine and for the motorship on the Pacific Coast, an important San Francisco engineering concern, namely, the Skandia-Pacific Oil Engine Company, has just completed an agreement of international importance with one of the oldest engineering firms in Europe, namely, Werkspoor of Amsterdam, Holland, whereby they will build Werkspoor-Diesel engines on the Pacific Coast. This arrangement, however, will not interfere in any way with the output of Skandia "semi-Diesel" oil engines, as the sizes of the Werkspoor-Diesel engines commence about where the Skandia motors leave off in power, so that the combined range of powers will vary from that for small work boats up to 15,000-ton ocean-going steel ships.

Werkspoor, whose full title is the Nederlandsche Fabriek van Werktuigen en Spoorweg Materieel (Netherlands Engineering Works), have had more varied and extensive Diesel oil engine experience than any other concern in the world, and was the first company to install a marine Diesel engine in a sea-going motorship (the "Vulcanus," built in 1910), previous to which they had been building stationary type Diesels for over ten years and marine steam-engines for nearly a century. In A. D. 1697 Czar Peter the Great of Russia worked for a year in their yard as a shipwright, their plant then being known as the East India Company, while on July 2nd, 1783 A. D., they astonished the world by launching three large wooden ships in one day, namely, the "Sirene," the "Batave" and the "Doggerbank," under the direction of Dirk van Haast, the construction having been commenced on January 2nd, February 5th and February 10th of the same year. Their marine steam-engine works alone employed one thousand men in 1847. Since 1910 they have placed in service 26 mercantile Diesel-driven ocean-going motorships, or more than any other company, and many more will soon be launched.

About two years ago Josephus Daniels, Secretary of the U. S. Navy, suggested to Werkspoor that they devote their unusual Diesel experiences to designing and producing a Diesel engine to propel submarines. This they acted upon and built at an enormous cost a motor to the special requirement of the U. S. Navy Department. This engine undoubtedly is the most wonderful ever constructed and is far advanced in design of the famous Krupp engine in German U-boats. This also was realized by two of America's largest battleship builders, namely, the Newport News Shipbuilding and Dry Dock Company and the New York Shipbuilding Corporation, who also succeeded in obtaining rights to build it.

The Skandia-Pacific Oil Engine Company now is ready to build this remarkable submarine engine for the United States Navy. Rear-Admiral Robert Griffin, Engineer-in-Chief of the U. S. Navy, has expressed most favorable comments on the highly developed design of this engine. Incidentally it also would make an ideal propelling plant for large



The water front of the Skandia Pacific Oil Engine Company and shipping a pair of Skandia engines from the factory, where the Werkspoor Diesel engine will now be made.

submarine-chasers and for motor yachts. Many disinterested engineering experts have paid the highest compliments about Werkspoor-Diesel engines, including Captain C. W. Dyson of the U. S. Navy Department and Mr. John Bogart of the American Krupp Diesel Engine Company. In a United States Government report (blue book) on the great engineering works of Europe it is stated that "there need be no hesitancy in stating that the class of workmanship at the Werkspoor Works is not excelled anywhere in Europe." In view of these facts the Skandia-Pacific Oil Engine Company may be congratulated on making such a historic connection. At the present time over 5,000 men are employed at the Werkspoor Works and the principal manufactures are turbines, reciprocating engines, sugar machinery, locomotives, bridges, trolley cars, railroad coaches and Diesel engines, and they may well be termed the Bethlehem Steel Company of Holland.

Considerable extensions will be made, says Mr. J. H. Hansen, President of the Skandia-Pacific Oil Engine Company, to our works in order that these engines may be turned out without interfering with our present large output of Skandia oil engines, and we shall have the assistance of experts from the Werkspoor Works, while the designer's drawings will be followed without the slightest deviation, so that the engines will be exact duplicates in materials and construction of those built at Amsterdam. We are ready to accept further orders to give fairly quick deliveries. The negotiations between Werkspoor and the Skandia Company were completed by Mr. T. Orchard Lisle, A. I. Mar. E. of New York City.

HENRY CHARLES TABRETT

The death of Henry Charles Tabrett on June 15 threw a decided gloom over the San Francisco waterfront. Tabrett's career on the Pacific Coast has been a long and honorable one and both shipping and construction circles have always held him in the highest esteem. He started his engineering education in locomotive shops in Scotland and from there drifted into marine engineering, becoming finally chief draftsman for a large Glasgow shipbuilding plant.

Leaving the shipyard, Mr. Tabrett went to sea, where he soon had a chief engineer's license. Leaving the sea after several years as chief on large ocean liners, he came to San Francisco and joined forces with the old Risdon Iron Works, where his locomotive experience as well as his marine practice stood him in good stead, the Risdon at that time being well known for locomotive construction.

Mr. Tabrett became chief engineer of the Risdon and when that concern went out of business he opened offices as a consulting marine engineer and continued to enjoy a wide patronage up till within a few months of his death.

CAPTAIN J. R. RAYMOND

Captain James Richardson Raymond died at his home in West Nutley, New Jersey, on May 20th, having succumbed to a severe attack of pneumonia.

Captain Raymond was born in Washington, D. C., on September 3, 1845, and therefore was 71 years of age. He received his education in the Washington schools and in Georgetown College. After serving in the U. S. Army during the Civil War, he became actively engaged in seafaring matters and was well known in the maritime world, particularly on account of his active interest in the matter of life saving at sea. This interest culminated in the inventing and patenting of the well known Raymond releasing device for ships' boats.

Captain Raymond leaves a widow and three sons, and his will provides for the continuance of the business for their benefit, which also means a benefit for all those who go to sea in ships. The Captain was a member of the Navy League of the United States, of the Shipmasters' Club of New York, and an associate member of the American Society of Naval Architects and Marine Engineers. His death will be keenly felt by the shipmasters along the East Coast, among whom he was widely known and liked.

Mr. George F. Rodgers of Salem, Oregon, and his associates have leased some property for a shipyard site from the Port of Astoria. Four building ways are contemplated.

Launch of the steamer "Edna Christensen" from the San Pedro plant of Charles C. Fulton.

With the Shipbuilders

RAPID progress is being made on the big wooden steam schooner building at the Kiernan & Kern Shipbuilding Company. While having only the one vessel on the stocks at the present time, this concern has room for three more building ways on their property.

The five-masted auxiliary schooner "Mount Rainier" was launched from the Schuback yard on Grays Harbor on June 16. The "Mount Rainier" is 296 feet long over all, 48 feet beam and 24 feet depth moulded and will be rigged as a topmast schooner. She is building Gaston, Williams & Wigmore of New York. Another schooner of the same dimensions was started on the ways vacated by the "Mount Rainier" the Monday following the launching. Work has also been commenced on the first of the government wooden ships assigned to this yard.

The second of four knock-down steel sternwheelers for Indian river service building at Yarrows Ltd., Esquimalt, B. C., is being shipped to India on the new big motorship "George Washington." Rapid progress on the remaining two steamers is being made. The parent firm of Yarrows in England is furnishing the machinery for these boats.

The Grays Harbor Motorship Company has laid keels for two of the government standard wooden ships.

The Metal Trades Association of British Columbia is organizing the machinery builders in the province with a view to handling as much as possible of the machinery required for the ships being contracted for by the Canadian Imperial Munitions Board. The driving machinery on the ships will be 950 horse power reciprocating engines.

The Seattle Machine Works is exceedingly busy at the present time, having two 600 horse power engines on order for the Pacific American Fisheries Company and a 2700 horse power engine for Skinner & Eddy. In addition to this, there is a large amount of tail shaft, thrust shaft, bearings and propeller work on hand.

Mr. Samuel G. Hedges, President of the Washington Shipping Corporation, closed a sale of six 2600-ton auxiliary schooners to the French Government early in June. The corporation's plant will be enlarged by the addition of two more building ways in order to expedite the work.

The motor schooner "Magrudada," formerly known as the "Mary," and the fourth vessel to take the water at the McEachern yard at Astoria, Oregon, was launched on June 7. The vessel has been sold to Brazilian interests, hence the change of name. The "Magrudada" is 266 feet long, 42 feet beam and 22 feet depth of hold and will be fitted with two 320 horse power Skandia engines.

The steamer "Storviken," built to the order of Haakon Wallen Company of Bergen, Norway, was launched from the plant of the Seattle Construction and Dry Dock Company on June 6. The "Storviken" is 368 feet between perpendiculars, 47 feet 9 inches moulded beam and 27 feet 3 inches moulded depth, being of 7500 tons deadweight capacity. She is fitted with a triple expansion engine of 2500 horse power and three Scotch boilers.

The Western Canada Shipyards Ltd., an amalgamation of Grant, Smith & McDonnell, the Northern Construction Company and McDonald & Morrison, has secured a site on False creek, Vancouver, with 750 feet frontage and 1000 feet depth. Four building ways are to be installed for wooden ships and steel shipbuilding is being contemplated as an eventuality. The six vessels now on order from this plant will be wooden hulls 280 feet in length by 44 feet beam. Mr. R. A. Mann, of the Northern Construction Company, is President and Managing Director of the new concern; Mr. Alex Morrison of

McDonald & Morrison is Vice-President and Mr. C. V. Cummings is Secretary and Treasurer.

The wooden standard ship as adopted by the Canadian Government and of which a considerable number have been contracted for in British Columbia yards is dimensioned as follows: Length 250 feet, beam 43 feet 6 inches and depth 25 feet with a deadweight capacity of 2800 tons on a 21-foot draft. The vessels are considerably heavier in construction than the U. S. Shipping Board's standard wooden hull. They will be fitted with box girder keelsons, have a deep tank forward for water ballast and be propelled by triple expansion engines of about 950 horse power. They will be constructed of Douglas fir and built to Lloyds requirements for A1 classification. The Wallace Shipyards Ltd. of North Vancouver will build eight of these vessels in addition to two steel steamers for British interests. The Cameron Genoa Mills Shipbuilders Incorporated will build four of the Canadian standard wooden ships.

The auxiliary schooner "Esquimalt" was successfully launched on June 13 from the yard of the Cameron Genoa Mills Shipbuilders Ltd., at Victoria, B. C. The "Esquimalt" will be fitted with twin 160 horse power Bolinder engines as auxiliary power.

The Pacific Shipbuilding Company Ltd. has been incorporated at Vancouver, B. C., for $50,000. Among the incorporators are J. C. Shields and J. T. Robinson.

It is understood that the Erickson Shipbuilding Company of Seattle is to build four and possibly six 8800 ton deadweight freighters for the Shipping Board.

The Helser & Unden Machine Works of Tacoma has received an order for fifty-five winches from J. F. Duthie & Company of Seattle. The winches are for five of the freighters building at the Duthie yard, there being ten cargo winches and one warping winch for each ship.

In addition to fitting the Mare Island Navy Yard for the construction of the largest ships, the government is erecting a camp on the island for five thousand men.

The Aberdeen Shipyard launched the auxiliary schooner "Santa Christinia," built to the order of W. R. Grace & Company, on June 14. The "Santa Christinia" is 235 feet long over all by 43 feet beam by 24 feet moulded depth. She will be fitted with twin 320 horse power Bolinder engines.

On June 14 the Matthews shipyards at Hoquiam launched the auxiliary schooner "Santa Isabel" to the order of W. R. Grace & Company. This craft is 225 feet long, 42 feet 6 inches beam and 28 feet 6 inches moulded depth. She is being fitted with twin 320 horse power Bolinder engines.

Twohy Brothers are to establish a wooden shipyard at Portland, their property being located between the holdings of the Eastern and Western Lumber Company and N. E. Ayer & Company.

The Hesse-Martin Iron Works of Portland is rapidly filling up with orders for auxiliary machinery for vessels. This firm is to supply all the auxiliaries for the ten government standard wooden ships that the G. M. Standifer Construction Company is to build. Boilers for these ten vessels will be supplied by Fred A. Ballin, the well-known Ballin water tube boiler being utilized.

The Anderson Shipbuilding Corporation is to lay the keel of a 3000-ton deadweight wooden hull for their own account at their new yard on Lake Washington. The vessel will be full powered and is to make eleven knots.

The National Shipbuilding Company at Seattle is rapidly completing its plant. Several derrick cranes are in place and a large gantry is being installed. A 1600-ton wooden steamer is being planked here and the keels for two 3500-ton auxiliary schooners have been laid.

The Meacham & Babcock Shipbuilding Company of Seattle was incorporated in the early part of June. This concern is capitalized at $300,000 and has a building site at Ballard, Washington. It is understood that keels for several large wooden vessels will be laid shortly.

Babare Brothers of Tacoma are refitting their yard for the construction of large vessels. This well-known Tacoma firm has held a very high reputation as builders of cannery tenders and fishing craft of all kinds and have decided to follow up their first successful venture on a large hull by putting in two permanent building berths.

The five-masted auxiliary schooner "City of St. Helens" was successfully launched at the St. Helens Shipbuilding Company, St. Helens, Oregon, on June 3rd. The "St. Helens" is 282 feet long over all, 48 feet beam and 24 feet 6 inches moulded depth. She will be fitted with twin 320 horse power Bolinder engines. This vessel, which is practically a duplicate of the "City of Portland," is building to the order of Chas. R. McCormick & Company.

The government is to expend $3,000,000 in fitting out the Bremerton Navy Yard for large construction work.

In addition to the contracts already mentioned in these notes, the Canadian standard wooden ship will be built by the following firms: The Foundation Company Ltd. will build five ships at the old Turpel shipyard, Victoria harbor; four hulls will be laid down at New Westminster by the British Columbia Construction & Engineering Company, which is associated with the Westminster Marine Railway Company; and the Pacific Construction Company, which recently took over the Coquitlam shipbuilding yard, will build two.

The Benicia Shipbuilding Company of San Francisco has been incorporated with a capital of $500,-

The "Dicto" ready to leave the ways at the Union Iron Works Company's Alameda plant and Miss Marian Lund, daughter of Henry Lund Jr., who acted as sponsor for the big craft.

000. The directors are: H. R. White of Berkeley, Cal.; R. L. McWilliams of Burlingame, Cal., and Howard Finn, Herman Phleger and Roland C. Forester of San Francisco.

The Union Iron Works Company is to build a large four-story brick warehouse on the corner of Illinois and Twentieth streets to serve as a storage building for machinery and finished products.

The U. S. Shipping Board has contracted for four wooden hulls of its adopted standard size with T. C. Desmond & Co., of New York.

The Navy Department has ordered twenty-four ocean-going steel tugs, to act as mine sweepers, from the Newport News Shipbuilding & Drydock Co., delivery to be made in six months. The same concern has been given four torpedo-boat destroyers to build.

The Merill-Stevens Company, of Jacksonville, Florida, is to build four large steel freighters for the Government.

The Shipping Board has assigned ten wooden standard freighters to the G. M. Standifer Construction Co., of Portland, Oregon, and four of these ships have been placed with the Peninsula Shipbuilding Co., of the same place.

The keel of a river boat was laid at the Louis Paquet yard at Kelso, Washington. This is the first shipbuilding at Kelso for a good many years. The vessel was started late in May and the builders hope to finish her in time to participate in this year's business.

Skinner & Eddy, of Seattle, have six of the Government 8800-ton freighters to build.

The Sloan Shipyards Corporation, of Seattle, will build ten Government standard wooden ships at its Olympia plant and six at a new yard at Anacortes, Washington.

The Grays Harbor Motorship Corporation, of Aberdeen, is to build four of the Government standard wooden ships.

The Coast Shipbuilding Co., of Portland, will construct four of the Government wooden ships.

The first work laid down at the new Todd shipbuilding plant, which is being rushed to completion at Tacoma, will probably be six steel freighters, of about 7500 tons deadweight each, for the U. S. Shipping Board. The Todd interests have been asked to build ten of these vessels, and the other four will be constructed at the Seattle Construction & Drydock Co. plant.

It has been reported that a new shipyard will shortly be in operation on Coos bay, Oregon, and that the concern will build four of the standard ships on the Government design and specifications. These ships will not be built under Government supervision, however, but will be offered the Shipping Board when finished and sold to private parties if the Government does not want them.

The new shipyard of the Hammond Lumber Co. at Samoa, near Eureka, California, is rapidly nearing completion. The Hammond interests have a portion of the old Bendixen yard under lease, but at the expiration of the lease this property will be utilized to expand the new Rolph Shipbuilding Co. and the Hammond activities will be centered in the new yard.

The United States Shipping Board has ordered ten steel freighters from the Seattle Construction and Dry Dock Company. These vessels will be 396 feet long, 53 feet beam and 29 feet 3 inches moulded depth. They will be driven by triple expansion engines of 2400 horse power and steam will be supplied by three Scotch boilers.

The "Edward Luckenbach," one of the cruiser-sterned steamers of the Luckenbach fleet.

THE CRUISER STERN CONTROVERSY

On June 9th "Shipping Illustrated," under the head of "A Questionable Improvement," printed an article comparing the steamers "Edward Luckenbach" and "Edgar F. Luckenbach." This article makes out an apparently clear case against the cruiser stern, using the trial trip data of the two steamers for purposes of comparison.

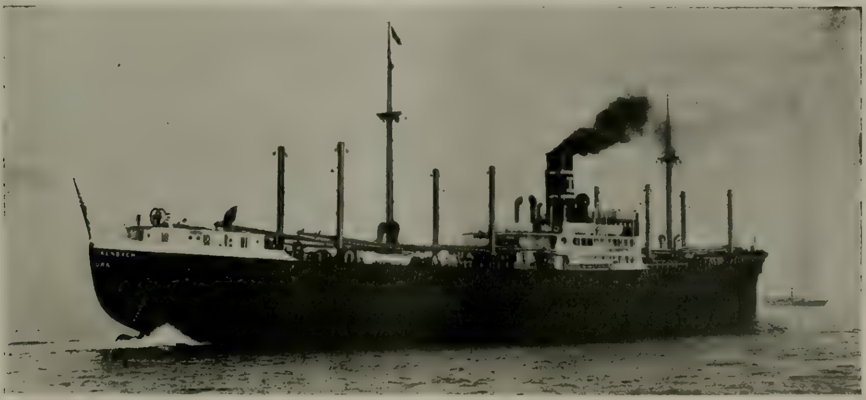
In the face of the showing of these two vessels on trial, however, the Luckenbach Steamship Company management is still strong in its belief in the cruiser stern or modified cruiser stern and this faith is shown in their building program.

In a discussion with Luckenbach officials over this question it developed that the "Edgar F. Luckenbach," which has the ordinary, orthodox, elliptical stern, was given a trial run before a heavy gale of wind and, the vessel being rather light, was materially aided as to speed by this circumstance.

It was pointed out also that owners were more interested in the showing made on long ocean voyages than in trial data. In this connection, fortunately, we have the engineers' log of the steamers "Edgar F. Luckenbach," ordinary stern, and "Edward Luckenbach," cruiser stern, for identical voyages from Balboa to New Zealand with weather conditions apparently about equal on each voyage.

The "Edgar F. Luckenbach," with 11,800 tons of cargo and fuel, averaged 11.3 knots for the voyage and consumed 7,520 barrels of fuel oil; the "Edward Luckenbach," with 11,900 tons of cargo and fuel, consumed only 6,980 barrels of fuel and averaged 13.6 knots. Thus we see that the cruiser stern vessel made 20 per cent more speed on 7 per cent less fuel than the craft with the ordinary stern and this with 100 tons more deadweight aboard.

Notwithstanding this remarkable difference in voyage performance between these two ships, by using their trial data "Shipping Illustrated" has been enabled to make out a rather convincing case against the cruiser sterned vessel, but in the light of the voyage performances quoted above the Luckenbach Steamship Company certainly has every reason to feel more than satisfied with their cruiser sterned craft.



Another view of the "Edward Luckenbach" showing the stern construction which has given rise to a considerable amount of controversy as to its advantages and disadvantages.

Shipping Finances

THE International Mercantile Marine Company, according to an estimate furnished by President P. A. S. Franklin, President of the concern, at a recent stockholders' meeting in Hoboken, earned $26,299,595 in the calendar year 1916, or $51.23 per share on the preferred stock. This compares with $13,581,660 for the year 1915 and a deficit of $302,528 in 1914.

The earnings as announced by Mr. Franklin include the returns from all steamers operated by the International Mercantile Marine Company. These include Frederick Leyland & Co., Ltd., American Line, Red Star, Atlantic Transport and the Dominion Line. The holding company owns all the capital stock of these companies except in the case of Frederick Leyland & Co., Ltd., of which it owns 42 per cent of the preferred and 98 per cent of the common stock.

Estimated gross earnings, after providing for the British excess profits tax, were $87,967,564 compared with $61,669,167 in 1915. Expenses increased from $33,399,386 to $54,306,891. It appears from the brief report that while the gross earnings increased steadily the drain of the increased excess profits tax offset the additional profits in the last part of the year.

Dutch Shipping Profits

Despite the many difficulties against which they had to contend, the leading Dutch steamship companies managed to make good profits last year, and in nearly every instance the annual reports, which are just making their appearance, announce increased dividends. Owing to the almost complete cessation of exports from Germany and the prohibition of the shipment of many articles by the Dutch Government, there was little demand for outward cargo space, but especially on the homeward voyage from America cargo was abundant and freight rates rose steadily. There is a general complaint that business would have been much more profitable but for the fact that a large amount of tonnage was requisitioned for carrying grain for account of the Dutch Government, the rates paid for this being much lower than those that could have been obtained in the open market. The amounts available for distribution were also decreased by the fact that considerable sums had to be reserved for the payment of the tax on war profits. So far the highest dividend is that paid by the Oostzee (Baltic) Steamship Company, which again gratifies its shareholders with 60 per cent. The Holland America Line declares 55 per cent, as compared with 50 per ecnt for the previous year; and some other dividends are: Royal Holland Lloyd, 25 per cent (12 per cent last year); Holland-Gulf Line, 40 per cent (10 per cent); Royal Netherlands S.S. Company, 20 per cent (15 per cent); Royal West India Mail, 12 per cent (12 per cent).

The Pacific Coast Steamship Company's balance sheet for the year ending December 31, 1916, is as follows:

ASSETS

Total fixed capital	$ 460,030.35
Cash and deposits	277,486.89
Notes receivable	1,111.11
Accounts receivable	908,785.34
Working assets	43,927.68
Miscellaneous	124,528.08
Total	$1,815,869.45

LIABILITIES

Capital stock	$1,500,000.00
Accounts payable	119,418.30
Int. and taxes accrued	5,516.10
Miscellaneous	52,564.76
Corporate surplus	138,370.29
Total	$1,815,869.45

Income and Profit and Loss Account

Oper. revenue	$3,974,866.83
Oper. expenses	3,978,423.09
Net oper. loss	$ 3,556.26
Non-oper. revenue	2,866.27
Gross corp. loss	$ 689.99
Deductions:	
Total deduc. (taxes)	$ 16,402.95
Net corp. loss for year	17,092.94
Dividends	260,915.35
Misc. add. to income	5,782.64
Misc. deduc. from income	3,999.78
Surp. on Dec. 31, 1915	$ 414,595.72
Surp. on Dec. 31, 1916	$ 138,370.29

Insurance on Cargo in Neutral Ships

Once again the question of establishing a large state scheme of war insurance for British cargoes in neutral vessels at fixed rates of premium has been raised by merchants, notably at the meeting of the Glasgow (Scotland) Chamber of Commerce. The question is a legitimate one for discussion by traders, but doubt may be expressed if it would be sufficient for those in favor of inaugurating such a scheme merely to point to the comparatively high rates which in some cases are quoted on cargo in neutral bottoms. If the facilities for insurance in the open market ever became inadequate, then there could be no doubt the British Government would at once step in and supply the

"Titan" (upper) and "Ixion" (lower), two of the Blue Funnel freighters that have been commandeered by the British Government.

want. I believe, however, that there is now no difficulty whatever in placing insurances for practically unlimited amounts in the British market. It is true that at times the market rates, which vary according to the trades and conditions, may seem high, and the cost has to be borne by the consumer, but ships are never kept unemployed because of this cost of insuring the cargo. That, in the present circumstances, seems to be the first fact which needs to be recognized.

Extension of Requisition Scheme

I learn that arrangements are now being made for immediately extending the British ship requisitioning scheme to the South and East African trades. The services affected include those from this country, Canada and the United States. As in the case of the other trades in which the scheme is being instituted, the arrangements provide for the hire of the ships to the Government at Blue-book rates, the payment to the State of the profits earned above these terms, and the setting up of a committee of management on which owners and the Shipping Controller will be represented, whose business it will be to insure that all the tonnage available is employed to the best possible advantage. The trade iin which the preliminary arrangements for instituting the scheme have already been completed are the Australasian, Indian, Persian Gulf, Burma, Straits Settlements, and Far Eastern, and the further extension of the system to, at any rate, practically all trades may be regarded as really only a matter of time.

There is reason to believe that the cordial reception accorded by owners to the quite revolutionary changes in business methods now being effected, and the absence of any discordant note, are thoroughly appreciated. Only disinclination to act on the part of the late Government prevented the inception of the scheme a year ago. For 12 months an enormous amount of freight space was lost to the food supplies and essential trades of this country by overlapping and the continuation of methods excellent in peace, but utterly unsuitable to war. It is only since the formation of the present Government and the creation of the Ministry of Shipping that shipowners have had an opportunity of putting themselves right with the public. They gladly seize the occasion to do so now, as they would have approved if the scheme, which was so obviously in the true interests of the country, had been put into operation at any time.

Shipbuilding in Denmark

In spite of difficulties arising from war conditions, the shortage of materials, which were formerly imported chiefly from Germany, the lack of experienced workmen, and unavoidable delays in deliveries, Burmeister and Wain, the well-known Copenhagen shipbuilders, are able to report that last year was the best in the whole history of the company. There was an unprecedently large demand for new tonnage, specially for the motor ships in which the company specializes, but contracts were only accepted on special terms, making the price dependent upon the cost of material, and it is stated in the report that deliveries of new vessels will be subject to considerable delays. Three motor ships and one cargo steamer were completed during the year, the total being 19,709 tons gross and 10,450 i.h.p., as compared with 26,719 tons and 16,050 i.h.p. in the previous year. A large amount of repairing work, however, was done, and as a result of the year's operations the shareholders receive the very satisfactory dividend of 35 per cent, while over 1,325,000 kroner is placed to the reserve fund, and a special reserve of 1,000,000 is created for meeting the impending extraordinary war taxation. As an indication of the manner in which expenses have increased, it may be mentioned that the amount paid in wages last year was 5,572,000 kroner, as compared with 5,092,000 kroner in 1915 and 4,633,000 kroner in 1914.

Mechanical refrigeration on board ship has become almost universal and today a new vessel of any size, providing she has power on board, that is not fitted with some type of mechanical refrigeration is a rarity. The gradual disappearance of the "iced" refrigerating on shipboard has been brought about by the double consideration of saving money and creating better living conditions for the crew.

European Marine Developments

(Exclusive Correspondence of "Pacific Marine Review")

London, May 23rd, 1917.

British Controller of Shipbuilding

I UNDERSTAND that Sir Eric Geddes, Inspector General of Transportation, has been appointed Controller of Shipbuilding, and will take up his new duties almost immediately. He will, it is believed, undertake the supervision both of naval and mercantile shipbuilding. Hitherto this latter function has been in the hands of Sir Joseph Maclay, the Shipping Controller, who will now be free to concentrate all his efforts upon the task of running the merchant marine under government control most economically and usefully in the national interest.

It is an open secret that the Admiralty and the Ministry of Shipping do not always approach the problem of mastering the submarine menace from quite the same angle, and naturally so. The Admiralty is concerned with the construction of craft designed to destroy enemy submarines; the Ministry of Shipping is concerned with building merchant ships to replace those which are sunk. Each department would obviously feel compelled to put forward its own case with all the force at its command, and hitherto the only authority which could fully weigh the claims of each and decide what proportion of labor and material should be allotted to warships and merchant vessels, respectively, has been the War Cabinet. The appointment of Sir Eric Geddes should simplify the task of the War Cabinet, which, of course, will remain the final arbiter if there should prove to be a difficulty in harmonizing the claims of each department. As a member of the Board of Admiralty he will know fully the naval demands and as a member of the Shipping Control Committee he will be primed completely with the merchant shipping case. It is also made clear that he will as well be concerned with the requirements of the War Office. With all the claims passing through the hands of Sir Eric Geddes, complete agreement should be facilitated. The appointment will bring the membership of the Shipping Control Committee, over which Sir Joseph Maclay presides, to four members. The committee has hitherto consisted of Thomas Royden, deputy chairman of the Cunard Steamship Company (Limited); F. W. Lewis, deputy chairman of Furness, Withy & Co. (Ltd.), and Sir Kenneth Anderson, a manager of the Orient Line.

Standardized Shipbuilding

With the State's standardized shipbuilding program practically in full operation, there is naturally less outspoken criticism of its underlying idea. Both shipbuilders and engine manufacturers are loyally supporting the powers that be, and saving up their arguments for and against standardization for use on another day. I find, however, that a great many contractors who believe that standardization is the correct policy in the prevailing circumstances are not quite so sure about its soundness for post-war conditions. Most of the men with whom I have discussed the matter take the view that in at any rate the case of cargo liners, wholesale standardization will be impossible. The pre-war practice was, they point out, to develop types to suit particular trades, and there was not much doubt that it paid to do so. When the war comes to an end, liner owners will, I am told, almost entirely revert to that practice. Even if they do, however—and I incline to the opinion that they will—it will not be the end but rather the due development of the idea of standardization. As it is, the State's standard ships are not all of one size and type. Nor are the standard ships which are contemplated by Continental countries, including Germany. On the other side of the North Sea and in France they talk of building ships "in series," which is almost exactly what will happen here if the cargo liner companies' idea of building particular types for particular trades is extended.

Systematizing Shipping Control

It is understood that as the result of informal conferences between Sir Joseph Maclay and the heads of several of the leading shipowning companies it has been resolved that two or three of the latter shall be called into frequent counsel with the Shipping Controller. This step, which will assist the solution of many difficulties arising from time to time between the Shipping Controller's department and the companies, is being taken with the approval of the Prime Minister, who realizes how much strength can be added to the British Government departments by thus bringing them directly into contact with business men and their methods. The country has not been made fully acquainted with the debt it owes to the great number of such men who, since the war began, have given voluntary aid in this direction and have done much to free some sections of public work from the incrustation of routine arrangements.

Cargo Liners and Tramps

Now that practically the whole of British shipping is requisitioned by the State, something is likely to be heard of certain anomalies in what are known as the Admiralty Blue-book rates of hire. These rates vary for different classes of ships, and the question which is now coming to the front is whether the distinctions drawn are always the best. In this connection it may be stated that the present rate for a cargo "tramp" steamer is $2.75 per gross ton per month, while the terms for "cargo liners" are considerably higher, and range according to the speed. It is admittedly not always easy to draw a clear line between what are "tramps" and "cargo liners," but hitherto the ruling of the Admiralty appears to have been that a "cargo liner" is a steamer scheduled to sail betwen fixed ports on fixed dates, mainly with cargo. The higher rates allotted to cargo liners are apparently paid solely on the ground of disturbance to trade and loss caused by their withdrawal from regular service. The weakness of the Admiralty definition seems to be that a very fine vessel may be built for a particular trade, with displacement, lines, engine-power and fittings that show her to be the peer of any cargo liner. In the practical experience of Government service her quality may enable her satisfactorily to do the work of any cargo liner. Yet because she did not, before the war, sail in the particular trade for which she was built, on definite dates, she is only entitled to receive a lower rate of hire. On the other hand, a steamer in no respect better than the ordinary "tramp," but employed before the war in a service with fixed dates, is entitled to the full rates of a "cargo liner." There is certainly a danger that if this system be maintained, owners, after the war, bearing in mind the possibility of Government requisitioning, will not be encouraged to build the finest type of cargo steamer. From the point of view of possible requisitioning for any service, it might seem to them better to build the greatest possible amount of cheap tonnage.

The anomaly of the present position is especially apparent when the fine type of vessel described above is sold to a liner company and becomes at once entitled to "cargo liner" rates, although hitherto she had been nominally only a "tramp." More than a year ago it was suggested in "The Times" (the principal London daily newspaper) that probably there could be no fairer system of payment than one based on the cost price of the ships—i. e., the capital employed—and it has yet to be shown that, while anomalies would occur under any method of payment which would need to be specially treated, there would not be fewer anomalies under that system than under the present standards.

British Shipping Industry

In a little work under the above title which has just been published by Constable & Co., (Limited), Edgar Crammond examines the position of British shipping as it was before the war, as it is now, and as it may be in the future. Mr. Crammond examines very closely the effect which the war has had upon the supply of shipping, and estimates that after allowing for losses and requisitioning there is only about 24,000,000 tons of shipping available for the international commerce of the world, which is but little more than half the total of 1913. Hence, very largely, the great rise in freights. With regard to the future, Mr. Crammond says that the war has modified the pre-war relations of the State with the shipping industry. There cannot, he says, be a resumption of the old free intercourse of trade for many years. Government control of imports and exports, he argues must remain for a time, and this must result in continued Government participation in the direction of shipping. With these conditions in view, the author, while combating the idea of the actual nationalization of the industry, advocates the establishment of an entirely new State department with the permanent object of directing and fostering British shipping, the actual working of the industry, however, to be left as much as possible in the hands of the men who brought it to the high level of development which had been reached before the war.

Liability of Shipowners for Negligence.

Some surprise has been expressed that the marine underwriters should have hastened to support the recommendation of the Dominion Royal Commission in favor of legislation on the lines of the Harter Act of the United States. The fact appears to be, however, that it was felt underwriters should not let the opportunity pass of endeavoring to remedy a state of affairs which for some years past has in certain directions been tending against their interests. Probably the difficulties arising from the use of a great many forms of bills of lading have had more to do with the cordial reception given to the commissioners' proposal than anything else. The fact that the clauses in the documents differ has meant that underwriters have from time to time unwittingly found themselves burdened with liabilities varying according to the ownership—in some cases these risks have increased during the currency of a policy—out of which shipowners have contracted themselves, and they have received no additional premiums in respect of them. And while there is undoubtedly room for divergent views respecting the proposal for legislation similar to the Harter Act, which makes it illegal for owners to contract themselves out of liability for loss or damage arising from negligence in proper loading, storage, delivery, etc., there seems to be general agreement among British owners, underwriters and merchants that nothing could be said against the adoption of standard bills of lading for each trade, and that much could be advanced in favor of it.

One great merit of the use of standard documents would be that all concerned would know precisely what their position was as regards their liabilities. That made clear, there should be no serious difficulty in arranging for the necessary insurance by each party. If legislation on the lines of the Harter Act is introduced in this country, then shipowners have already in existence the means in the form of mutual clubs in which they at present protect themselves in respect of their liabilities under the Acts of the United States, Canada and Australia. If, on the other hand, the liabilities which, according to some, properly belong to shipowners are definitely stated in the bills of lading to be those of the merchants, then the latter could easily arrange with their underwriters specially to cover them. The chief objection, from the British shipping point of view, and expressed very strongly by a shipping writer in the London "Times," to "Harter legislation" appears to be that, unless it were international British owners might be unfavorably situated as regards competition with those foreign owners who accepted no such responsibility. Merchants as a body would probably be found strongly in favor of the legislation in the interest of simplification, although it would seem from a recent discussion at the London Chamber of Commerce that there is no great likelihood of their pressing for its immediate adoption in the circumstances of the war.

Difficulties of Shipping Goods

The reorganization of the merchant service now in progress under the Shipping Controller is leading to a modification of the terms on which goods are bought for shipment. A normal practice is for goods purchased for delivery to a specified date on f.o.b. terms to be sent to the docks and paid for against dock receipt, because in the ordinary way their shipment will be effected within a few days. In present conditions, railways decline to accept goods unless consigned to a specified steamer in course of loading. When, therefore, the Shipping Controller requisitions a steamer for other duties, and gives no indication as to the date when a substitute will be put on the berth, all parties concerned are placed in a quandary, especially as to the adjustment of the financial burden involved in uncertainty and delay. For this reason many makers are declining orders except on condition of payment as soon as they are ready at the factory, irrespective of shipping conditions.

More Liners for the Thames

When conditions are again normal, I read in an important British provincial newspaper, more liners will be based on the Thames, and that accommodation for them is now being provided by the Port of London Authority. Before the outbreak of hostilities good progress was made with the scheme for the improvement of the river's facilities, and since then a fair amount of work has also been done in this connection, although it will be some years yet before the plans are completed. At Tilbury, for instance, vessels up to about 25,000 tons can now be conveniently dealt with, and I hear that the new berths have been allotted to the Cunard Company and the White Star Line. Much bigger steamers will now be able to make use of the Thames, as the new development forms part of a larger scheme of extension which the Authority has in view. In one place a dry dock 750 ft. long and 100 ft. wide is nearing completion, while it will soon be possible to bring ships of 20,000 tons up to the India and Millwall Docks. It is hoped, among other things, to regain much of the trans-shipment trade which in recent years was captured by Hamburg and Rotterdam. As a matter of fact, important changes are expected at all the principal British ports.

Empire Trade and Shipping

There are signs that the seeds sown by the Dominions Royal Commission in their recently published report have not fallen on barren ground, and more is likely to be heard before long of certain of the commercial recommendations. Among these is the proposal that legislation should be introduced on the lines of the Harter Act of the United States, the effect of which is to make it illegal for clauses to be inserted in bills of lading relieving shipowners from liability for loss or damage arising from negligence, fault, or failure in proper loading, stowage, custody, or delivery of merchandise. Legislation on similar lines has been passed in Canada, in Australia and New Zealand. Some of the other questions—particularly those concerned with improved Imperial shipping services, although of immense interest to shipowners and merchants—are rather for the future than for the present. For instance, during the war the proposal to build 18-knot steamers for the South African route to Australia is hardly likely to come within the region of practical politics. Even in normal times it would raise many questions, although, probably, with the development of the turbine, issues of a commercial rather than a technical kind. An 18-knot steamer for a long voyage means a large ship with cargo space of sufficiently large earning capacity to offset all the space required for powerful engines and fuel. A very large ship involves long periods for loading and discharging, and these operations are complicated in the case of Australia by the numerous ports now visited by liners which would not be satisfied to be treated as other than ports for ocean traffic. But the tendency before the war was to build larger and faster ships, and far-sighted owners undoubtedly look to see the policy developed further after the war. The main question is one of finance.

Inter-Allied Chartering Executive

Now that the Inter-Allied Chartering Executive which was created early this year has got well into its stride, it is obvious that there is no longer necessity for strict adherence to the terms of the Limitation Freight Schemes for France and Italy. When the French and Italian schemes were inaugurated in the summer and autumn respectively of last year there was no form of general supervision over the chartering of neutral vessels by British firms. Ships were chartered irespective of whether the intended service was in the real interest of this country or not. As the charterers of these vessels, bidding against each other, frequently cared nothing what they paid, rates were forced up, and it became necessary for the Board of Trade, in order to keep down the price of coal to the consumer, to stipulate for rates of freight at which vessels required for the French and Italian coal trade were to be chartered.

This year the position as regards the individual chartering of neutral vessels by British firms has been altered. All British firms are now required to show that the proposed transaction is a desirable one for the Allies. As the whole of chartering is thus personally reviewed by the Executive, the paper control of a portion of the business becomes out of date. The personal supervision will have obvious advantages over the hard-and-fast set of rules to all concerned, and probably most of all to the neutral shipowners, who will be able to rely upon any special merits or any peculiarities of their case receiving every reasonable consideration. There can be little doubt that the inelasticity of the old limitation schemes was the means of frightening away a number of vessels which may now be expected to return.

It is understood that the scheme under which the Inter-Allied Chartering Executive was set up is working with the utmost smoothness as between France, Italy and this country. There are French and Italian representatives at the London offices, and the three nations now have the satisfaction of knowing that the services which neutral vessels can render are in no instance being dissipated in unnecessary trades.

Standardized shipbuilding I dealt with at some length last month, but it is pretty clear that all shipbuilders are not entirely satisfied at the building of the standard cargo ship as the swiftest way of meeting the dearth of shipping caused by the German submarines. Many of these shipbuilders declare that, before constructing the new standard type, material should be provided for the completion of ships already on the stocks. The fact is that there are a considerable number of ships in various stages still awaiting their steel plates. Some of these ships are standing as they were at the beginning of the war. Now it is obvious that the real economy would be to finish the ships upon which much work has already been done. Take as an instance the case of a ship on which 2,000 tons of steel has already been worked in, and another 100 tons would complete it. It would be folly for the mills to roll only the steel for the standard ships, which at best could not be ready under several months. Some of these uncompleted ships are intended for faster passages than the standard ships, and the shipbuilders' view is that these ships should be finished at once purely as cargo ships, and put on the seas, leaving the passenger fittings to be put on after the war.

Regarding the standard ships which are being laid down, not only in the yards accustomed to cargo-boat construction but in all the big yards, there are two varieties, but there is not much difference in type. The speed will be somewhat faster than the present carriers of that size. They will be the property of the State under the management of the Shipping Controller. They are being paid for on a new system with a definite sum for on-cost charges and profit, to which will be added the cost of labor and material. The design was arranged by a conference of shipbuilders with the Controller, and one shipbuilder on the Clyde and one on the Tyne each drew the standard design for those localities.

There are also two varieties of marine engines of the reciprocating, triple-expansion type. A standard ship does not mean that all the vessels are identical. It is impossible to carry standardization beyond a certain point. The exact standard parts will be the frames and sections and angle sections, and this will mean one of the chief savings of time and labor in rolling the steel. The plates are not standardized, for their sizes must vary according to the appliances in the different yards for lifting and fitting and the machinery for punching the rivet holes. A very big saving will be effected by the standard engines, as they will be rapidly produced, and can be fitted into any ship whenever she is ready. One of the constant delays in ship work is that the ships are sometimes well ahead of their engines or the engines well ahead of the ships. So with the steam steering-gear, winches, and other installations, and everything, indeed, down to the compasses—there will be a constant stream of supply towards the shipyards, and the assembling, fitting in, and finishing is expected to move at a pace that will be a revelation to most shipyards.

Dr. Ira N. Hollis, President of the Worcester Polytechnic and President of the American Society of Mechanical Engineers at the plant of the Curtis Aeroplane Co., Buffalo, N. Y.

DR. IRA N. HOLLIS

The accompanying photograph shows Dr. Ira H. Hollis, President of the American Society of Mechanical Engineers and also President of the Worcester Polytechnic Institute, and was taken in the shops of the Curtis Aeroplane Company at Buffalo, New York, on March 7, when Dr. Hollis was visiting the Engineering Society of Buffalo. Dr. Hollis was formerly a navy man and received his first engineering instruction at Annapolis and in the construction corps of the U. S. Navy. For several years he was stationed at the Union Iron Works when that concern first started government contracts and many of the older shipping men and engineers will remember the able and popular young naval constructor. Dr. Hollis addressed the Buffalo engineers on "Preparedness," and said in part:

"There is a place for and it is the duty of every American citizen to serve his country during the present crisis. History repeats itself and I can but compare the present crisis in this country to the days of the war of 1812. At that time England issued orders that United States ships should not be allowed to trade with certain islands and that they believed they had the right of search. It was after this war that there was added an additional member to the cabinet. The position of Secretary of the Navy was created.

"If another nation should conquer our territory and reduce us to near slavery, it would destroy the principles upon which this democracy was founded by the people, for the people and for the brotherhood of mankind.

"Obedience to law is liberty, although some of us have a false conception of liberty, freedom and equality. The country at present is in an inefficient state. The only way to overcome this is by unity of purpose, co-operation with our fellow workmen, loyalty to our country and preparedness for war against war. The United States lacks efficiency and this great wrong can be corrected by the efficiency engineer. It ought to be the life purpose of every engineer to correct this mistake."

HEINE BOILERS FOR FIRST SHIPS OF NEW U. S. EMERGENCY FLEET

At a meeting at the offices of the Heine Safety Boiler Company, 11 Broadway, N. Y. C., on May 16th, a contract of unusual significance was entered into, for the boilors for the first of the ships of the new emergency fleet, being built under the supervision of Major-General Goethals.

Contract for these ships, eight in number, of 8800 tons dead eight capacity, and 426 feet length and 54 feet beam, was recently awarded to the Los Angeles Ship Building and Dry Dock Company.

The negotiations for the boilers were consummated by Mr. Samuel L. Naphtaly, Vice-President of ship building company, and Mr. E. C. Meier, President, and Mr. Paul H. Brangs, Director, of the Heine Safety Boiler Company.

The equipment comprises four standard Heine marine boilers for each vessel, making thirty-two units in all. Each boiler is to contain 2900 square feet of heating surface. Boilers will be oil fired and built for 200 lbs. working pressure.

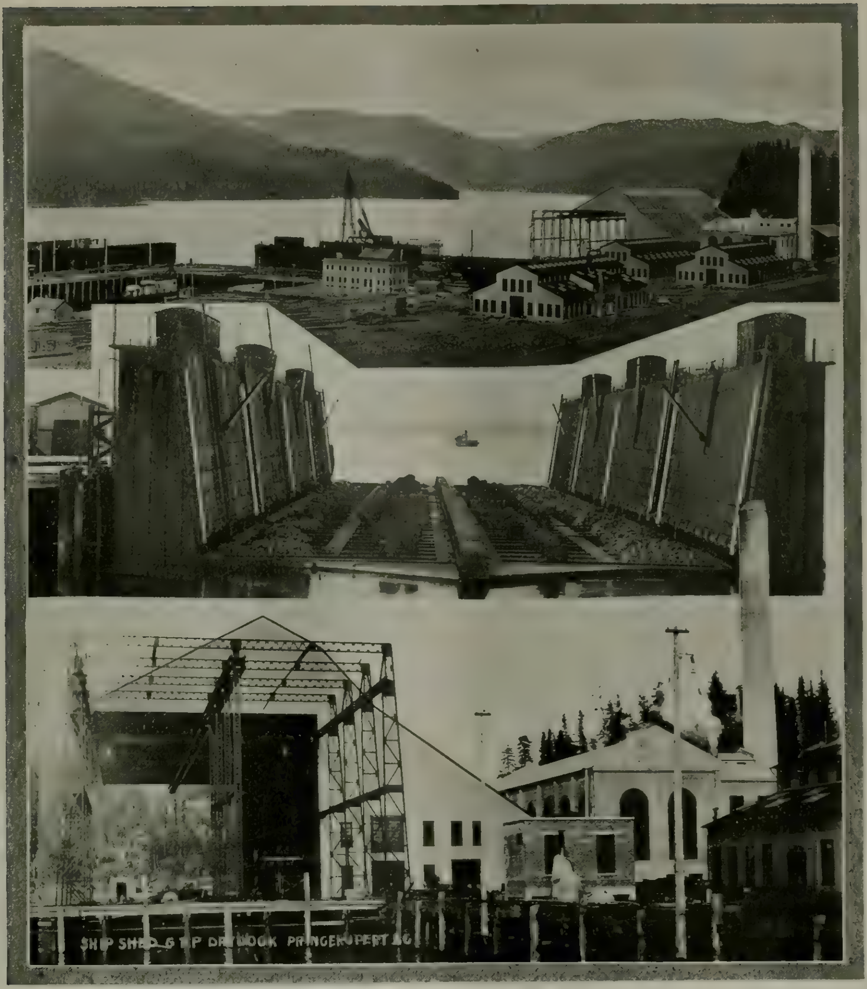
In general the design of these boilers is similar to those installed on the "Minnesota" and also now being installed on the ships of the Luckenbach Steamship Company, building at the Fore River Shiubuilding Company, and the Sun Shipbuilding Company.

PRINCE RUPERT'S PLANT

The illustrations herewith show the shipbuilding and repair plant of the Grand Trunk Pacific Railway system at Prince Rupert, British Columbia, a well designed, compact plant built specially to fill the requirements of this railroad's steamship interests.

While the climate of Prince Rupert is mild enough to permit of outdoor work the year round, there is so much rain that it was decided to carry on construction work under cover. With this end in view, the unusual ship shed shown in the upper and lower pictures was designed, the idea originating with Mr. Frank E. Kirby.

This building is 300 feet long by 160 feet wide, and the entire weight of the structure is carried on the center line of foundations. As will be noted, one-half of the roof is carried as an overhang and besides its own weight supports two 10-ton traveling cranes. The steel lattice work shown at the end of this building in the lower

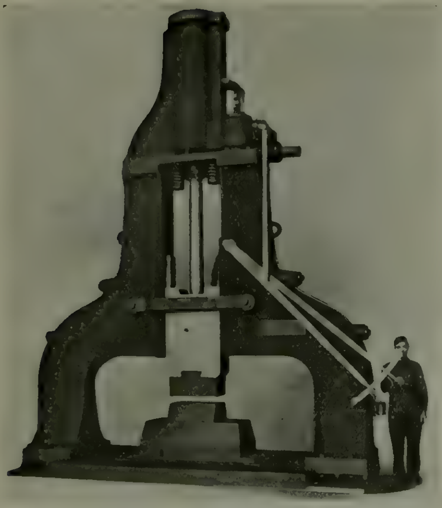


The Prince Rupert yard of the Grand Trunk Pacific Railway System. Upper, a general view of the yard and shops; center, the first pontoons of the large floating drydock; and bottom, a close-up view of the unusual shipshed at Prince Rupert.

picture is for the purpose of carrying the cranes out over the wharf and car tracks to facilitate the handling of material from and to cars or ships.

The flooring under the overhanging portion of the building is carried on very heavy piling and the outer 40 feet slopes 2¼ inches to the foot and serves as a launching-ways for the side launching of vessels. The covered-in portion of the building in the rear of the building-berth houses a complete and up-to-date equipment of woodworking tools, while the second floor, 300 by 80 feet in the clear without obstructions of any kind, is utilized as a mold loft. The center line of column supports are carried on concrete piers, some of which run to solid rock while others are carried on piles. To guard against individual columns settling, a vertical truss was worked between capable of distributing the load from one column to the two adjoining. Very heavy wind-bracing was also introduced to take care of the extreme weather conditions which sometimes prevail. The great weight of the overhanging portion, in addition to the traveling cranes and their loads and wind strains, made it necessary to provide heavy concrete bases for the rear columns, so that under extreme conditions considerably more than the actual weight of the building is borne by the center foundation columns. The tools in this ship shed are air driven.

The first work performed in this shed was the building of pontoons for the floating drydock shown in the center picture. This dock was designed by William T. Donnelly and when completed will be of 20,000 tons capacity. The pic-



A Bement double frame hammer for the Edwin Forrest Company.

ture shows the first unit of four pontoons in service.

The upper picture shows the general lay-out of the yard and shops with machine shop, pattern shop, sawmill, fore shop, office building, etc. The 50-ton shear legs, fitting-out wharf, and the sheltered character of the harbor can clearly be seen in this view.

EDWIN FORREST EXPANDS

Of interest to the shipbuilding and allied industries is the news of the incorporating of the general blacksmithing and forging business of Edwin Forrest into the Edwin Forrest Forge Company.

Mr. Forrest was for many years general foreman and heavy forger for the old Pacific Rolling Mill and the Risdon Iron and Locomotive Works. In 1901 he started in business for himself and built quite an enviable reputation as a manufacturer of well-drilling tools and equipment. Five years ago he branched into marine gas engine and ship work, and now numbers among his customers some of the largest manufacturers of marine and Diesel engines on this coast.

The new firm will specialize in cam, crank and steamboat shafting, shipsmithing, machine forging, well boring, drilling and fishing tools, hammered steel shoes and dies, and forged mill balls.

They are prepared to take contracts for anything in iron or steel from a bolt to an anchor.

Additional equipment is in transit, and when received the Edwin Forrest Forge Company will have the largest and best equipped general blacksmithing and forge shops in the West.

Steel contracts have been signed, whereby the firm is assured of having on hand, at all times, a large stock of Lloyds open hearth and alloy steel forging billets.

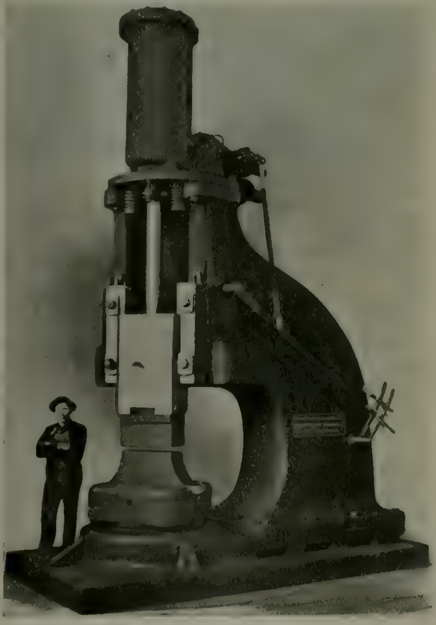
It is their intention to use the present plant at Fremont and Mission streets, San Francisco, with its six steam hammers, furnaces, electric cranes, etc., for general shipsmithing and intermediate forge work.

To take care of the heavy forge work, land with spur track and water facilities has been purchased on the Oakland estuary, where everything will be in readiness for the installation of the large Bement steam hammers now in transit from the East.

Captain John F. Blaine, representative of the United States Shipping Board in Oregon and Washington, has appointed Mr. Harry Brandt as his chief clerk; Mr. C. H. Hamilton as disbursing officer; Captain W. A. Magee as traveling inspector; Captain W. Z. Haskins as assistant traveling inspector, and Mr. Elwyn H. Bruns as engineer inspector.

Mr. Lloyd J. Wentworth, President of the Portland Lumber Co., has been named as the Columbia River and Oregon district representative of Major-General Goethals, Manager of the Shipping Board.

Captain Frederick Rouse, well known up and down the Pacific Coast, is in Astoria, from whence he will deliver the Brazilian ship "Magrudada" to her owners. Captain Rouse has acquired quite a fame for this sort of work, having been on just such jobs for the past year or two from the east coast.



One of the Bement single-frame forging hammers to be installed by the Edwin Forrest Company.

Mainly About People

MR. O. H. FISHER, of the Union Gas Engine Company, one of the best known men in the engine-building field of the United States today, was recently honored with the Presidency of the National Gas Engine Association. This is a well deserved tribute to Mr. Fisher's ability as well as to the untiring interest he has taken in the affairs of the Association.

Mr. Charles E. Fulton, the San Pedro shipbuilder, spent a portion of the past month in San Francisco looking over the shipbuilding field here.

Mr. Harold H. Ebey has been appointed operator of traffic for the United States Shipping Bureau. Mr. Ebey was for many years Pacific Coast agent for the Kosmos Line, and his new duties which embrace the local federal district, will again place him in charge of two of the Kosmos boats, the "Setos" and "Serapis." After winding up local affairs for the Kosmos Line, Mr. Ebey took charge of inaugurating an Australian service for the Luckenbach Company. Ebey is an able steamship man, and his appointment has given general satisfaction.

Mr. A. T. Highfield, one of the best known steel shipbuilding experts on the Pacific Coast, recently resigned his position with the Northwest Steel Company to take charge of the installation of Dan Hanlon's new steel shipyard. Mr. Highfield has had many years of shipbuilding experience, having been successively with the Newport News Shipbuilding & Drydock Company, Cramps, the Union Iron Works, the Moore & Scott Iron Works, and finally with the Northwest Steel Company.

Captain Charles Moody, for twenty-five years in the service of the Union Steamship Company of British Columbia, has been appointed a Vancouver pilot. It is understood that Pilot Robinson Jones has decided to retire and that Captain Moody will take his place.

Mr. J. H. Simmons, general manager of the San Francisco branch of the Baldwin Freight Forwarding Company, an important New York concern, has been appointed Vice-President of the concern.

Mr. Frederick J. Koster, President of the San Francisco Chamber of Commerce, has appointed Mr. H. L. Corbett, President of the Portland Chamber of Commerce, and Mr. H. E. Pennell, Manager of the Coast Shipbuilding Company, as members of the Pacific Coast Navigation Laws Committee.

Mr. Chas. W. Hand, for many years Vice-President and General Manager of the William Cramp Ship & Engine Building Company of Philadelphia, has been appointed President to succeed Mr. Henry S. Grove, who resigned some months ago and was made Chairman of the Board of Directors. Mr. J. Harry Mull, Hand's former assistant, succeeds him as General Manager.

Mr. Percy Davis, chief clerk in the commissary department of the Pacific Coast Company, has accepted a position with Captain John F. Blain, Northwestern representative of the United States Shipping Board.

Mr. Raymond E. Lovekin, managing director of the American Screw Propeller Company, was a visitor to the coast during the past month. Mr. Lovekin visited Seattle, Portland, San Francisco and other ports and reports a highly successful trip and expressed surprise at the shipbuilding progress on the coast.

Mr. T. Orchard Lisle, American representative of the Werkspoor Company of Amsterdam, paid a brief visit to San Francisco in the middle of June in connection with the Skandia-Pacific Oil Engine Company's taking over of the manufacturing rights for Werkspoor engines on the Pacific Coast. Mr. Lisle reports that interest in internal combustion engines throughout the country is steadily increasing and that the continued and improving good showing of many installations are gradually breaking down the natural prejudice that is always manifested against radical changes in motive power.

Mr. Frank Walker, well-known Seattle consulting engineer and naval architect and agent for the American Engineering Company, the Welin Marine Equipment Company and the Submarine Signal Company, as well as the William Cramp Ship and Engine Building Company, has announced that his son, Mr. Kenneth Walker, who until recently was with the Union Iron Works Company of San Francisco, is now associated with him in his Seattle offices.

Mr. John Eadies has resigned his position as general manager of the Wallace Shipyards Ltd. of North Vancouver, B. C. Mr. Eadies' resignation was made imperative through ill health, but during his short career as executive of the Wallace yards he gained a host of friends who will be sorry to learn that he has had to retire from active work.

Mr. Arthur Cameron, whose name has been identified with gas engine work during the past few years, has taken over the work of Mr. John H. Clayton at the Standard Gas Engine Works while the latter gentleman is training for the aviation corps on the French front.

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Salvage Facilities

THE crying need for a fully equipped salvage plant on the west coast of the United States is once more emphasized by the present condition of the "Sinaloa," a Norwegian steamer partly loaded with nitrate for Tacoma, which went ashore on Cape Blanco on June 15th.

The only salvage plant available on the entire coast is that of the British Columbia Salvage Company with headquarters at Victoria, B. C., and they have but one steamer, the "Salvor," which is capable of attending to salvage work along the coast. To obtain the services of that plant it is necessary, of course, to ascertain first if the "Salvor" is available and then to get the permission of the Ottawa Government for her to leave Canadian waters and then to get permission of the Washington Government for her to work on the coast of United States possessions. Fortunately, in all cases of need, neither government has placed any obstacles in the way, but the contingency of the "Salvor" being otherwise engaged must be taken into consideration.

The "Salvor" has done some good work on this coast, but in all cases of salvage time is a very important factor, and the length of time necessary for her to arrive at the scene of her operations and the added expense by reason of this extra time have proven, in many cases, disastrous. When the steamer "Newport" was sunk at Balboa in August, 1912, the nearest available wrecking outfit was that of the Columbia Salvage Company and the "Salvor" was sent to her assistance. It is true that the "Newport" was raised and returned to her home port, but at an expense of over 100% of the value saved, the extra expense being due to the length of time it took for her to reach the sunken vessel, which time, as well as that taken for her to return to Victoria, had to be included in the salvage charges. The "Salvor" was also sent to the assistance of the steamer "Bear," ashore at Cape Mendocino in August, 1916, but by the time she arrived there the "Bear" was past saving, whereas had a salvage plant been quickly available she would, with her cargo, have undoubtedly been floated. The "Salvor" was also sent to the assistance of the steamer "Congress," which was gutted by fire off Eureka in September, 1916, but arrived too late to be of any material assistance. In these three cases alone property to the value of over three millions of dollars was at stake and much of which could have been saved had prompt and efficient assistance been close at hand.

A short time ago the Union Iron Works Company had the steamer "Iaqua" fairly well equipped for salvage service, but the venture apparently was not a paying one, for it was given up and the "Iaqua" was sold.

Unfortunately for the "Sinaloa" the "Salvor" is engaged in Canadian waters and is not available. This necessitates the gathering together of the necessary wrecking outfit, including divers with their gear, anchors, hawsers, mechanics with their tools, and a quantity of paraphernalia, which may or may not be needed, and most of all the chartering of a suitable steamer which can approach the stranded vessel and on which the wrecking crew can be housed and fed. At this time steamers are scarce and the price to be paid is high.

It is quite true that a well-equipped salvage plant ready for service at any time would not be a source of profit for private enterprise on this coast for the cost of the upkeep is heavy and the time of actual work spasmodic, yet it would seem to be a good investment for underwriters, not alone by underwriters located on this coast, but by all underwriters writing insurance on vessels and cargoes which may be exposed to the perils of the coast. The cost of organization and upkeep could be assessed on the basis of premiums collected annually on such insurance and in event of salvage services performed the value of the services, like the award of a court, could be assessed in general average against those directly benefited and the profits credited to the general fund, thus reducing the annual assessments.

The time will come when it will pay private

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capital to embark in this business on this coast, but until that time comes some combination of those directly interested, and who can afford the initial outlay and the expense of upkeep, is needed.

EXCESS GENERAL AVERAGE CLAUSE

In a recent issue of this paper I commented on the attitude of some underwriters in connection with settlements under what is now known as the "old clause," which clause read, "to pay the excess of general average or salvage charges for which the owner of the vessel may be liable in consequence of the contributory value of the vessel exceeding the insured value in the ordinary policies of insurance on hull and machinery."

In the case then under discussion the contributory value of the vessel was far in excess of the policy value and the difference between these values was considerably in excess of the amount of insurance taken out to cover the general average assessed on this difference. It was contended by the underwriters that they were liable only for their proportion based on the amount of the insurance as compared with the difference in values, while the owners claimed that the underwriters were liable up to the face of the policies, there being no restrictions in the clause. It was then predicted that the dispute could only be settled by the courts.

Whether suit was brought or not I do not know, apparently not, for in a recent issue of "Fair Play" it is reported that in a similar case the underwriters admitted their liability and settled in full. In that case the contributory value of the vessel was 100% in excess of the policy value and the insurance covering the excess general average was about 4/27th of the difference in values and had the underwriters made good their contention they would have paid but that proportion of the amount of general average falling on the difference in values. But, as stated, they paid in full.

There are several claims still outstanding and some of considerable magnitude, but it is likely that this recent action on the part of the English underwriters will be accepted as represenuting the liability under the "old" clause and settlements will be made without dispute.

The "new" clause distinctly provides that the underwriter is liable only for his proportion based on the amount of insurance as compared with the difference in values, or with the entire amount of insurance against this feature, and under this there would appear to be no ground for argument.

THE "MISSING" VESSEL

In the last issue of this paper appeared an article in connection with the settlement of claim for total loss as between marine risk and war risk underwriters in the case of a "missing" vessel.

It appears that there has been considerable discussion in England as to the advisability of leaving this question to arbitration. It has been stated that unless there is proof to the contrary, the loss must be assumed to have occurred through perils of the sea and the loss will fall upon the marine risk underwriter. But if there is proof as to the cause of the loss of the vessel that immediately takes her out of the class of "missing" vessels and the liability is at once determined. It is suggested that in the case of many so-called "missing" vessels the Government might have before it some facts that it could not divulge to underwriters or arbitrators and in that case an arbitration would be no more than a guess based upon certain possibilities or probabilities which are as well known to the underwriters as to the arbitrators. If a part of the underwriters are in possession of information which must lead to a conclusion as to the cause of the loss it would seem to be their duty to disclose it to their co-underwriters in order that the assured may recover for his loss from one or the other sets of underwriters. In the absence of that why should not the liability be divided?

I have been informed by one of the leading American companies that in the case of a purely "missing" vessel they are prepared to settle under their marine policies as for a total loss.

R. B. H.

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PACIFIC COAST SALES MANAGERS

SAN FRANCISCO, CAL.

MARINE MISHAPS

With the exception of the total loss of the Str. "Coronado" during the latter part of April, marine losses on the Coast were of minor importance until during the third week in May, when word was received here of the probable total loss of three cannery tenders and their cargoes. Fortunately, there was no loss of life. The three ships, the "St. Francis," the "St. Katherine" and the "Standard," with their cargoes represent a monetary loss of about half a million dollars, but the ultimate loss resulting from delay in getting supplies to the canneries to which these ships were bound cannot be estimated. Tin plate, of which commodity all three ships carried a quantity for the making of cans, is by no means plentiful, and the loss of time necessary to get a further quantity, as well as other supplies, to the canneries may result in a serious reduction in the salmon pack for the season. While the reports received indicate that the three vessels with their cargoes are total losses, there will likely be considerable salvage. The local market carried most of the insurance.

"THISTLE"—Str. From Seattle for Bristol Bay, went ashore April 18th, on Pender Island, B. C., and became a total loss. Vessel valued at about $25,000 and insured for $10,000 with Seattle agencies.

"FORT BRAGG"—Str. From Cardenas for San Francisco via Mexican ports, arrived at Acapulco, April 18th, with boilers leaking. A boilermaker with new tubes was sent to Acapulco to make the necessary repairs.

"CORONADO"—Str. From Columbia river for San Francisco, caught fire on April 24th. She was picked up by the Str. "Hoquiam," but later she turned turtle and was abandoned. Subsequent efforts to locate the wreck failed. The steamer was valued at about $75,000 and was partially insured in the local market.

"ST. FRANCIS"—Sp. From San Francisco, April 22nd, went ashore in Unimak pass on May 14th and is reported to be a total loss.

"ST. KATHERINE"—Sp. At Ugashik from San Francisco with cannery supplies, was driven ashore in the Ugashik river on May 9th, and is reported to be a total loss.

"HOMER"—Str. From Santa Barbara for San Francisco, broke port tail-shaft on May 15th, and proceeded to Long Beach for repairs.

"NUUANU"—Str. From San Francisco, May 8th, for Seattle, became disabled through the breaking of a condenser and was towed into Eureka by the steamer "Florence Olson." Repairs were made and the steamer proceeded.

"ALCATRAZ"—Str. From Greenwood, May 13th, for San Francisco, struck the rocks outside the harbor and remained fast. Efforts to float her will be made.

"STANDARD"—Sp. From San Francisco, April 9th, for Bristol Bay, went ashore May 14th off Nushagak and was abandoned. Reported to be a total loss.

"G. C. LINDAUER, Str. Arrived at Marshfield, June 10th, from San Francisco, leaking, having struck a rock near Cape Blanco, and a part of hte cargo of cement was dahaged. After discharging cargo, temporary repairs were made and the steamer returned to San Francisco with a part cargo of lumber.

"GOVERNOR," Str. From San Francisco, June 12th, for San Pedro, was in collision the 13th with the U. S. R. C. "McCullough," in consequence of which the revenue cutter was sunk. All hands saver. The "Governor" had some slight damage to the bow plating.

"SINALOA," Nor. Std. From the west coast of South America for Tacoma via San Francisco, June 13th, went aground on the 15th at Cape Blanco. At this writing the after hold is full of water, the forward hold tight, and the cargo of nitrate being lightered from that hold. Prospects of saving reported to be good.

"WESTERNER," Str. From Columbia river, June 13th, for San Francisco, struck on the south jetty of the Columbia and put back to Astoria. Deckload of lumber was discharged and the steamer weent to Portland for repairs.

"WAITOTARA," Br. Str. From San Francisco, May 23rd, for Melbourne, has been abandoned at sea on fire.

"SADO MARU," Jap. Str. From Tacoma for Kobe and the far East, has been reported as having a fire in the cargo at Kobe. Extent of damage not known.

"ALEXANDER T. BROWN," Schr. From Fremantle for Manila, May 17th, went ashore outside of Fremantle and is reported as being a total loss.

SHIPBUILDING

The Columbia Engineering Works of Portland launched the auxiliary schooner "Tempate," built to the order of M. T. Snyder, on June 16. The "Tempate" is 171 feet long, 36 feet beam and 14 feet depth of hold.

The Wallace Shipyard No. 2 at North Vancouver has been sold to Peter Lyal & Son, contractors of Montreal. It is understood that the purchasers will contract with the Imperial Munitions Board for six of the Standard Canadian wooden ships.

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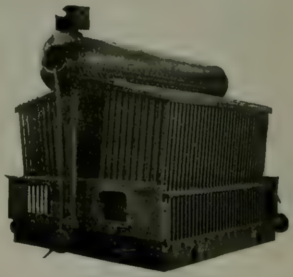

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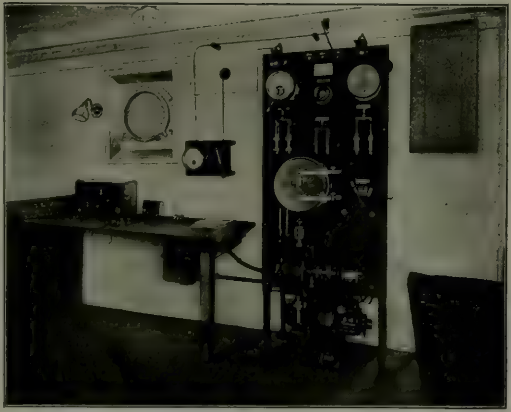

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British Shipbuilding

In view of the Prime Minister's declaration that the absolute assurance of victory is to be found in the one word "ships," it is of special interest to learn from an authority on the subject that satisfactory progress is being made with the construction of standard ships, in accordance with the plans prepared by the Shipping Controller (Sir Joseph Maclay) and his advisory committee. At first the firms that built to their own specification did not appear to take very kindly to the uniform scheme, but now they have fallen into line, and it is fully expected that 500,000 tons will be completed in six months, and that afterwards deliveries will be considerably accelerated. In the case of engines a ready-made design was adopted, and by now large quantities of castings, forgings, and plates are being put together. As regards the American proposals, we hear on this side of the Atlantic that oil engines will be employed as the propulsive power, and that the establishments concerned are quite confident that they will be able to keep pace with the shipyards, which have undertaken to build a thousand wooden boats of about 3,000 tons carrying capacity each.

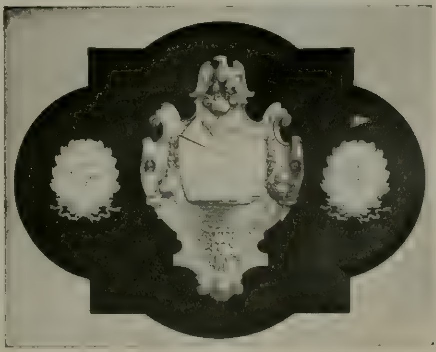
Strong representations have been made by influential representatives of the shipping community to the Shipping Controller on account of the congestion at the docks and in warehouses brought about by the requisitioning of cargo liners. Replies have been sent by the department intimating that the urgent needs of the export trade are thoroughly realised by Sir Joseph Maclay, and that effective steps are being taken to maintain communications with all the principal ports, especially in overseas Britain. In some instances lines are being amalgamated, so that a vessel usually trading to A and another customarily trading to B are required to take half-cargoes to A and B respectively. This method gives to each a more equable distribution in point of time than would be the case if goods for one port had to wait several weeks while goods for the other were being cleared away. The promise is made that the present congestion will be overtaken quickly, and that afterwards there will be a constant, if irregular, service for all essential destinations.

A GREAT YACHT RACE

Great interest was manifested about San Francisco Bay on June 17 when the sloops "Presto" and "Pronto" started to decide which was the fastest boat. Each of these tidy craft had her own enthusiastic following as both sloops have helped to make racing history. The race on the 17th was for the Frank Sime trophy and proved one of the best contested races ever held on San Francisco Bay. The "Pronto" was manned by Messrs. Fred Sime, Koe Pracy, Lee Kilborn, Howard Norton and Hugh Murray. On board the "Presto" in addition to her new owner, Stuart Hynes, were Frank Mettman, Joe Coles, S. McLain and Bill Wiley.

Walter A. Scott, Photos.

The "Presto," left, and the "Pronto," right, which furnished the San Francisco bay yachting circles one of the finest races in many seasons.



The "Frank Sime" trophy, for which the "Pronto" and "Presto" raced.

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San Francisco, Cal., April 21, 1917.

TO SHIP OWNERS:

The Federal Telegraph Company, utilizing the Poulsen system, has equipped a great number of freight and passenger vessels plying the Pacific during the past three years, breaking the World's record in range and reliability of transmission.

The United States Navy demands highest efficiency and after careful investigation has adopted the Poulsen radio equipment for both land and sea.

We invite you to investigate Federal service and satisfy yourself what Poulsen radio equipment really means.

Our representative will gladly furnish full details relative to rentals and installation, upon application.

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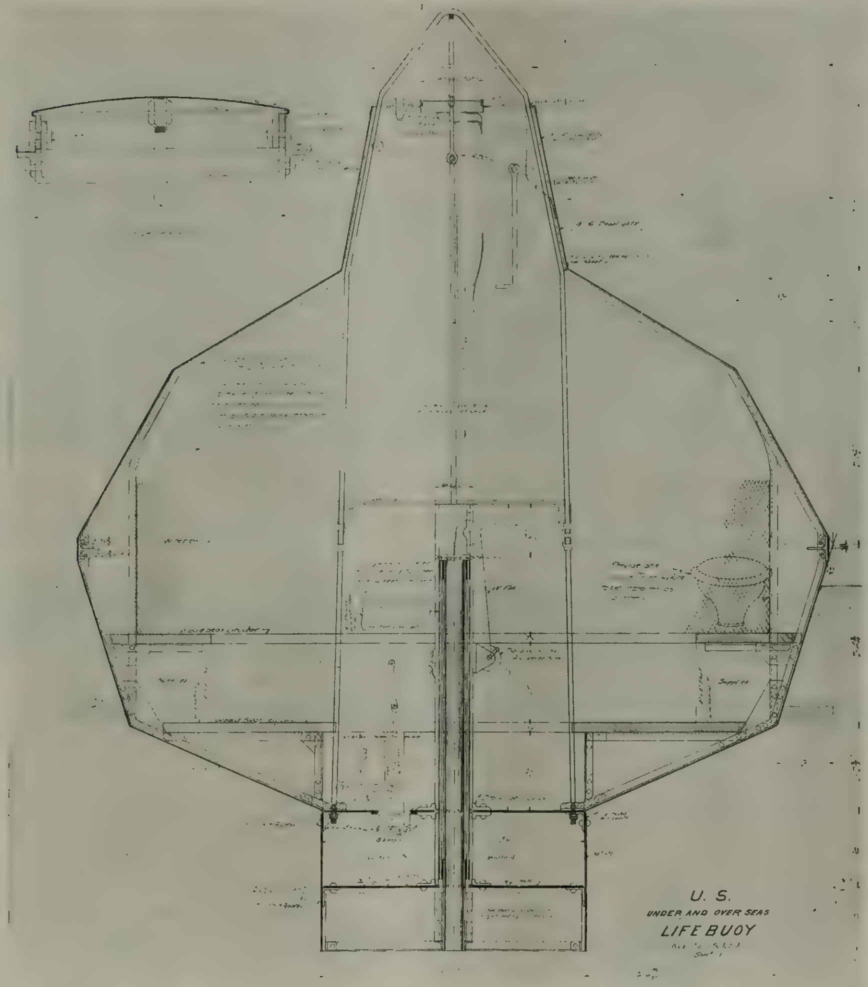

A NOVEL LIFE-SAVING DEVICE

Interest in devices for life saving at sea is naturally very keen at the present time and among the appliances lately patented that gotten out by the Under and Over Seas Life Buoy Company presents many interesting features.

This buoy was recently demonstrated in the Willamette river at Portland, Oregon, and proved a complete success. One of them has been placed on the auxiliary schooner "Juanacaste" of the M. L. Snyder Lines of New Orleans and practical sea tests may soon be carried out.

The buoy as constructed is circular in form and is built of No. 14 B. W. G. steel galvanized. It is ten feet in diameter at the widest part and 8 feet 6 inches in height and fitted with a base flange three feet in diameter and 11 inches high. Into this flange is drawn a ten-foot telescopic water anchor by means of a hand winch and a light cable. This anchor consists of galvanized tubing in four lengths, each length telescoping inside the other and being drawn into the largest piece of tubing, which is substantially bolted to the bottom of the buoy. Fastened to the bottom of the inner or smallest piece of tubing are vanes, which assist in steadying the buoy in a sea-way.

The buoy is fitted with two rows of seats, giving sufficient space for thirty persons. On the upper row of seats is installed a regular pump-flushed toilet arranged to be curtained off. On top of the anchor casing and attached to the four ⅞-inch brace rods is a seat for the lookout man, who has control of the air valve in the conning tower, which can be locked either open or shut. Air is forced out of the buoy by a hand rotary fan. Four 6-inch deadlights near the top of the conning tower give ample light in the interior of the buoy. The space under the seats is utilized for water and food storage, the buoy being provisioned with ten days rations for its full capacity. Of course a full equipment of signal rockets, etc., is carried, also a pole mast and flags for day signalling.

The device is a very compact and well-built arrangement. A bilge pump is provided to take care of leakage and spray entering through the ventilator at the top of the conning tower. The total weight of the apparatus is 1200 pounds and it will be seen from the accompanying plan that there would be a wide margin of reserve buoyancy even when the buoy was filled with persons to its full carrying capacity.

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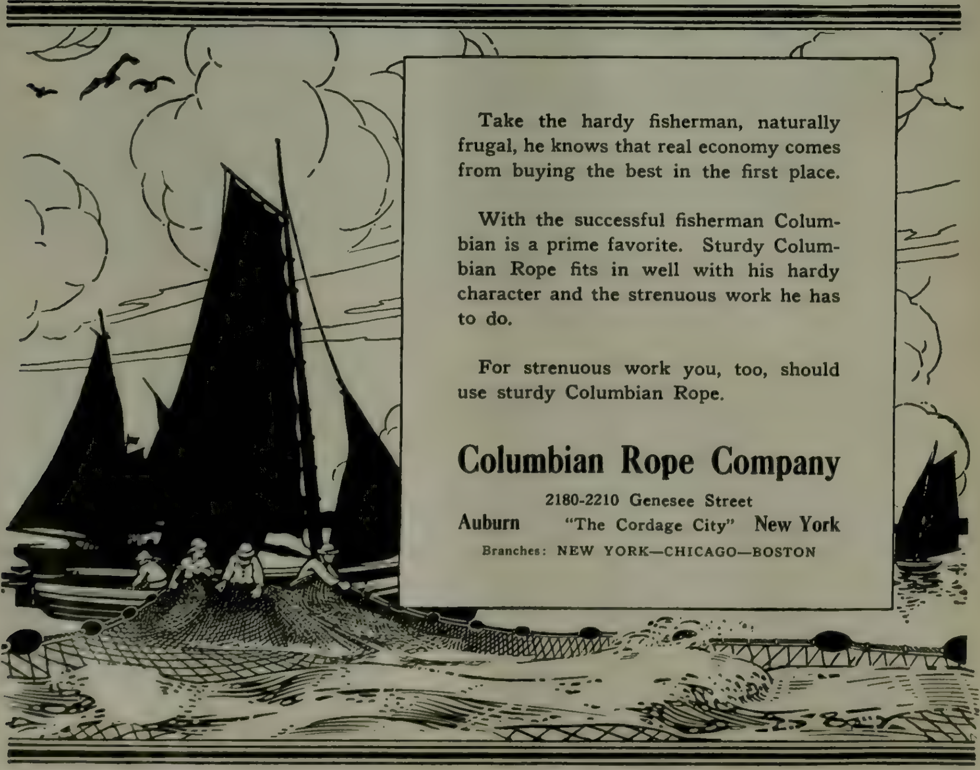
PORTLAND, OREGON

BUILDERS OF BALLIN COMPOSITE SYSTEM
Wooden Ships
DIAGONAL PLANKING STEEL TOPSIDES



Take the hardy fisherman, naturally frugal, he knows that real economy comes from buying the best in the first place.

With the successful fisherman Columbian is a prime favorite. Sturdy Columbian Rope fits in well with his hardy character and the strenuous work he has to do.

For strenuous work you, too, should use sturdy Columbian Rope.

Columbian Rope Company

2180-2210 Genesee Street
Auburn "The Cordage City" New York
Branches: NEW YORK—CHICAGO—BOSTON

A "Little Giant" four-ton truck doing yard transfer duty at the Union Iron Works.

TRUCK MAKERS ARE OPTIMISTIC

The following extracts are taken from an interesting article on the prospects for the motor truck business for 1917 by Mr. W. O. Duntley, President of the Chicago Pneumatic Tool Company, the makers of the "Little Giant" truck:

"The manufacturer of motor trucks has many reasons for feeling optimistic over the future of his business. The well-known makers have recently closed the most prosperous year of their history, and many of them have been far oversold.

"This has been due to the heavy volume of business which has speeded up industry all along the line.

"To keep pace with the growing demand we have greatly increased the capacity of our Chicago Heights factory, the 'Home of the Little Giant,' and have been able to contract for delivery of a generous amount of material for the coming twelve months.

"While the price of horses has steadily increased, the cost of motor trucks, despite the greatly increased costs of labor and raw material, has shown no appreciable rise. This is due to the fact that production has greatly increased, resulting in reduced overhead.

"It is now, therefore, actually cheaper to install a motor truck delivery system than a horse and wagon delivery system. Therefore, firms installing delivery systems for the first time are invariably installing motor trucks, while firms which now use horses and wagons recognize that motor trucks are vastly more economical to operate, more durable and less troublesome, and are making the change to motor trucks as rapidly as their finances permit."

"Firms which have hauling to do are, of course, anxious to get this done as efficiently and economically as possible. This not only means that they must install motor trucks, but the large haulers must install various sizes of trucks for various classes of work. A large packer should have a heavy 3½- or 5-ton truck for hauling to and from the freight depots and then he should have a 1-ton truck for local delivery work, etc.

"The fact that such conditions exist, and that many concerns prefer to buy their entire line of trucks from one manufacturer has influenced us to build a complete line of trucks. Another influence was the incessant cry from our dealers for a line of models, and the plausible claim that they could make much more money by handling a complete line. As far as heavier trucks are concerned, many old customers who have bought air tools and compressors from us for years, have demanded heavier trucks than we have until now been able to supply. In view of these considerations, we have added the Little Giant Convert-a-Car (converts a Ford into a 1-ton truck); the Model 17, 3½-ton worm drive, and the Model 18, 5-ton worm or chain drive. The Model 18 is biult on orders only and will not be carried in stock."

THE LUMBERMAN TO HELP

The lumber interests of the United States and Canada will be able to come immediately to the aid of the world to prevent a famine in ocean carriers because of the submarine war. The conference on Wednesday last at Washington between the Shipping Board, lumbermen and other interested parties brought a request of the lumbermen of the country to aid in the supplying of merchant ships.

The following is a condensed statement of what is now being done in the Pacific Coast and Great Lakes regions of the United States, and the Pacific and Atlantic coasts of Canada:

Owing to the high prices of steel and the time required for construction of steel ships, the wooden ship is coming back into its own, chiefly in the form of schooners with auxiliary engines, chiefly internal-combustion types. There are sixty-eight wooden vessels under construction on the United States' Pacific Coast, with a combined carrying capacity of 88,563 tons, or an average of over 1,000 tons. Each vessel is using 1,250,000 feet of lumber in its construction, and built for lumber carrying, chiefly, although available for any variety of tonnage if required; has a capacity of 1,500,000 to 2,000,000 feet of lumber each. Inasmuch as the plant facilities for building these vessels are not expensive or detailed, this type of ship can readily be built in large quantities. In the War of 1812, it will be recalled, Commodore Berry converted trees from the forest into warships in ninety days, and this time can be beaten on modern larger ships by the modern equipment easily obtainable.

There is a revival of the building of schooners such as formerly constituted the chief bulk of the Great Lakes fleets, and practically all of which have been sent down the lakes for Atlantic Coast charters. Within the week a Kenosha builder has entered the market for 48-foot oak timber, 7 by 9 inches, for keels for schooners and small power-cruisers.

The United States has just felt this need. In Canada, however, shipbuilding has become one of the great war industries of the Dominion, there being contracts placed for ships at a total cost of $209,000,000. There are seven schooners of the American type being built now in British Columbia with a total capacity of 10,500 tons.

A Vancouver syndicate has let contracts for the build-

LOCUST TREENAILS

A large stock of all sizes on hand for

IMMEDIATE SHIPMENT

Special prices on carload lots for direct shipment from Eastern Mill

ALSO IRONBARK AND OAK PLANK AND TIMBERS

WHITE BROTHERS

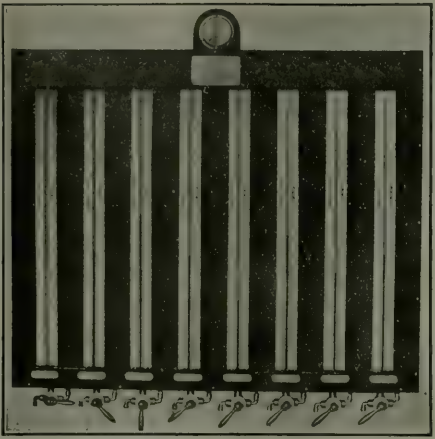
5TH AND BRANNAN STS.
SAN FRANCISCO, CALIF.

Pneumercator Company Furnishes

Draft Indicators---Tank Indicators

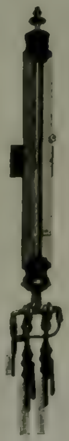
Model D-I Pneumercator indicates the fore and aft drafts of a vessel and registers the mean draft and corresponding tons displaced. Shows trim, checks invoices and deliveries, weighs cargoes and bunkers

Model T-I Pneumercator indicates depth and volume or weight of fuel oil, fresh water, ballast tanks or bilges. Checks invoices or withdrawals. Furnishes perpetual inventory. It works equally well on tanks open to the atmosphere, under pressure or vacuum.



MODEL M. T. I.—MERCHANT TYPE

Distant Gauge Glasses



This instrument will indicate the height of the water in a boiler at any reasonable distance from the boiler and either above or below it. It will indicate instantly all water level changes.

Electric Whistle Operators

The Signal & Control Co. has appointed us its sole agent for its well known ELECTRIC AUTOMATIC WHISTLE OPERATOR. This operator is manufactured in various sizes—for motor boats as well as for large vessels.

PNEUMERCATOR COMPANY, Inc.

118 LIBERTY ST., NEW YORK, N. Y.

PHILADELPHIA, PA.
Geo. E. Lawrence
306 Bullitt Bldg.

NEW ORLEANS, LA.
Mr. F. J. French
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Jas. C. H. Ferguson
Monadnock Bldg.

SEATTLE, WASH.
W. S. DePierris Co.
103 Grand Trunk Dock

LONDON, E. C., F. S. Dudgeon, Ltd., 30 Great St. Helens

The "J. W. Van Dyke," a Union Iron Works tanker and one of the many recent vessels turned out by the Potrero plant of the Union Iron Works Company.

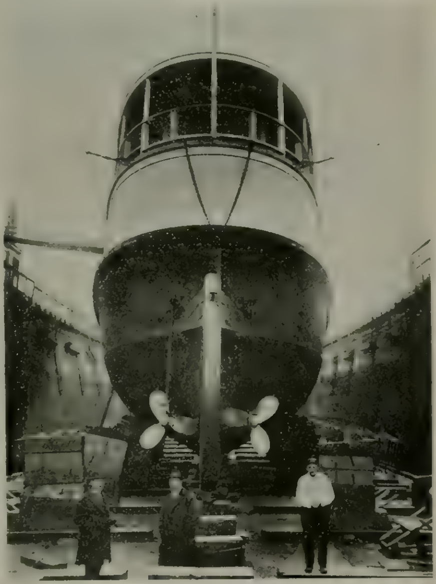
ing of three 2,000-ton vessels to cost $1,250,000 each. Another Vancouver firm has taken a contract to build six five-masted schooners of the American type of lumber carrier, one to be launched every two months. The provincial legislature has passed an act guaranteeing an annual dividend of 15 per cent on the actul cost of all these ships for a period of ten years, provided they are built in the province and sail from British Columbia ports. These ships will be built to carry grain, for the export rate of grain from the grain-fields of the Nechako and Bulkeley River valleys and parts of Alberta is capable of competing with the rate through Fort William and Montreal by rail and lake.

The best timber for shipbuilding in the Dominion is on the Pacific Coast, but in order to stimulate the building of similar work on the Atlantic Coast, the Grand Trunk Pacific, which touches the heart of the lumber region, such as the Nechako and Bulkeley valleys, and the region about Prince Rupert, as well as Vancouver, through a branch line connecting at Prince George and the Canadian Pacific roads are giving special attention to lumber shipments from the Pacific Coast to the Atlantic shipyards, the lumber going practically on passenger schedule. The total vessels on order in the yards of Vancouver are twenty-five, only four of which are steel.

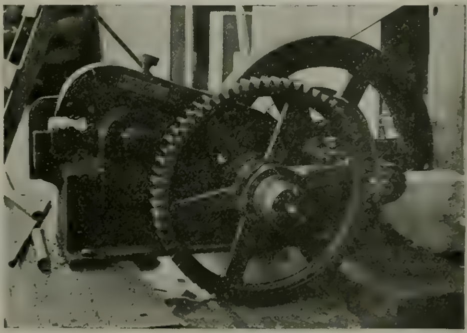
The Atlantic Coast has not been idle. There are thirty-five vessels being built in Yarmouth, Nova Scotia, all of wood. These, like the Pacific Coast vessels, are intended chiefly to constitute an emergency ocean-going merchant fleet, but destined eventually for coastwise trade.

Meanwhile the Canadian government is seeking to stimulate shipbuilding on the Great Lakes. It is believed that some of the acquisition of shipbuilding facilities on the lakes last year were on behalf of the Canadian government. Vessels laid out are to be of 4,000 tons capacity, adapted for offensive and defensive patrol duty as well as freight service. Among the plants secured are the St. Clair plant of the Great Lakes Engineering Works and the Marine City plant, S. C. McLoud Shipbuilding Company.

Of the historic old three-masted schooners, common on the lakes forty years ago, which have demonstrated on the coast that they are serviceable for ocean traffic, are the "G. J. Boyce," of Milwaukee, taken to salt water by Capt. Peter Larsen of Chicago, and the "Minerva Hackley" of Lake Michigan, "Irondale" and "John H. Meade" of Lake Erie.



The "San Cosme," formerly the Columbia River Lightship. The staunch hull of the lightship was overhauled and twin 110-hp. Standard gas-engines fitted.



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Engineers Machinists
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SHIP-BUILDER
Designer and Builder of
Wooden Commercial Vessels
of all Descriptions
Yachts and Pleasure Craft
Kennedy & Boehmer Streets
Phone Fruitvale 430 OAKLAND, CAL.

FOR SALE--AT A BARGAIN!

One 15"—32"—20" ENGINE—only slightly used and in excellent condition.
1 Set of (NEW) 10"x48" STERN WHEEL ENGINES, complete with Piston Valve for high pressure, Shaft and Flanges.

SEATTLE MACHINE WORKS, Inc.
Lander St. and East Waterway
SEATTLE, WASH.

JEFFERY'S MARINE GLUE

Use No. 1 Extra Quality for filling deck and hull seams of Yachts and Motor Boats.
Use No. 2 First Quality Ship Glue or No. 3 Special Navy Glue for filling deck and hull seams of merchant vessels.
Use No. 7 Soft Quality or Waterproof Liquid Glue for filling and waterproofing canvas for covering boats, canoes, cabin tops, decks and flying boats.
No canoeist should be without an Emergency Can of our Special Canoe Glue.
For Sale by All Boat and Canoe Supply Houses, Hardware and Sporting Goods Dealers
Send for Free Booklet, "Marine Glue, What to Use and How to Use It."
L. W. FERDINAND & CO. :: :: :: 152 KNEELAND ST., BOSTON, MASS., U. S. A.

MANAGER AND ENGINEER

of one of the largest and most modern wooden ship yards on the Pacific Coast will be open for an engagement about July 15th. Can secure technical and practical assistance. References exchanged.
Address "MANAGER," % "Pacific Marine Review."

HIGH FUEL EFFICIENCY
DIAMOND BRIQUETS
PACIFIC COAST COAL COMPANY
Main Office:
SEATTLE, WASHINGTON
BUNKERS AT SEATTLE, TACOMA AND PORTLAND

Van Arsdale-Harris Lumber Company
FIFTH AND BRANNAN STREETS SAN FRANCISCO, CALIFORNIA
White Cedar, Spruce or Sugar Pine Template Lumber
Worked to Any Thickness Desired
Redwood Pattern Stock
In All Grades and Thicknesses
White Cedar
For Mould Loft Flooring
Long Clear Fir Timbers • Vertical Grain Fir Decking
Sugar Pine • California White Pine

The express messenger launch "Ajax" of the Union Iron Works Company fleet crossing San Francisco bay in a southeaster. This speedy little craft is from the shops of G. W. Kneass, San Francisco's leading boat builder.

THE "AJAX"

The accompanying pictures show the service launch "Ajax," of the Union Iron Works messenger fleet, crossing San Francisco bay in a southeaster. The "Ajax" is 40 feet long over all, 7 feet 6 inches beam, and 34 inches draft. She was built by George W. Kneass, being designed by Mr. H. C. Carlson of that well known boatbuilding firm. The little craft is planked with white cedar and is copper fastened throughout. The decks are of teak on the battened seam construction, and all framing and keel is of oak. Fore and aft strength members are in one piece of Douglas fir. The interior cabins and also the bulkhead are of mahogany. There are three water-tight bulkheads forward of the engine, and the compartments thus formed, in addition to the copper air tanks fitted under the seats in the cabins, render the "Ajax" practically unsinkable. The engine is an eight-cylinder Van Blerck, with cylinders 5½ inches in diameter by 6 inches stroke, operating at 1700 revolutions and delivering 220 horsepower. A Leece Neville electric starter is fitted, and the propeller is of Coolidge design.

AN INTERESTING DECISION

The following notice, recently received from New York, is of great interest to the large number of wireless enthusiasts — professional and amateur — and also to all commercial radio telegraph companies:

"One of the most important opinions rendered in the history of wireless telegraphy was handed down last week by the New York Circuit Court of Appeals in the suit brought by the Marconi Wireless Telegraph Company of America against the De Forest Radio Telegraph & Telephone Company for infringement of the well-known Fleming patent.

"The opinion of the Circuit Court, written by Judge Hough, affirmed the decision of Judge Mayer of the Federal District Court. The plaintiff complained that the defendant's so-called "Audion" was an infringement.

"Judge Mayer held that the Fleming patent was of great merit and value and that the "Audion" was an infringement on the patent. He also held that the Marconi Company's apparatus did not infringe, seven of the patents owned by the De Forest Company.

"The opinion of Judge Hough of the Circuit Court of Appeals said that the Fleming patent 'displays invention, and of a very meritorious device' and that six of the seven infringements claimed by the De Forest Company were not infringements and that the seventh was void.

"The result of the opinion, of great interest to all users of wireless apparatus—both commercial and amateur—is that the Marconi Company has the basic patent for 'vacuum' detectors."

PROGRESS IN WATER WORKS PUMPS

Water works pumping plants have recently undergone a rapid and radical evolution. The tremendously heavy and expensive, although efficient, triple-expansion pumping engine has given place to the more compact, simple and less costly steam-turbine-driven centrifugal pump. The efficiency of the latter has risen steadily with the experience of its builders and with improvements in auxiliary equipment, until duties under standard steam conditions exceeding 150,000,000 ft.-lb. per 1000 lb. of steam are now obtained. The De Laval Steam Turbine Co., of Trenton, N. J., builder of the largest pumps of this type, has just issued, under the title "Progress in Water Works Pumps," a 48-page booklet discussing the general economic and engineering conditions affecting the design and installation of such pumps. Installations in fifteen of the principal cities of this country and Canada are described, including thirty-four units aggregating 999,0000,000 gal. per day capacity. The publication should be of value to anyone interested in the handling of water in large quantities.

WESTINGHOUSE MERGER EFFECTED

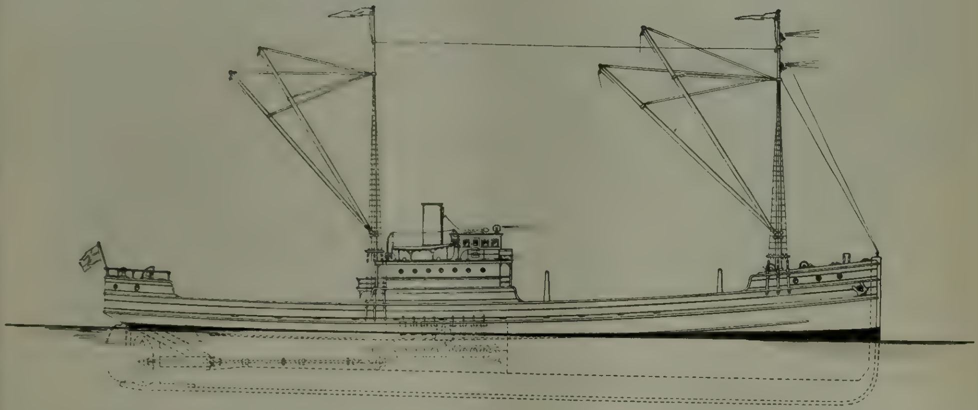
At the annual meeting of the stockholders of the Westinghouse Electric & Manufacturing Company, held at the offices of the company at East Pittsburgh on Wednesday, June 13th, a vote was taken on the merger of the Westinghouse Machine Company with the Westinghouse Electric & Manufacturing Company, and, as was expected, the vote was unanimously in favor of the merger.

The following Directors whose terms expire this year were re-elected for four years: J. D. Callery, Paul D. Cravath, Harrison Nesbit, James N. Wallace.

At a meeting of the stockholders of the Westinghouse Machine Company held at the company's offices at East Pittsburgh, Wednesday, June 13th, the proposition to merge the Westinghouse Machine Company with the Westinghouse Electric & Manufacturing Company was carried by a large majority, and the Directors and officers of the Westinghouse Machine Company empowered to arrange for the execution of the merger.

The following Directors whose terms expire were re-elected for one year: J. D. Callery, E. M. Herr, H. T. Herr, William McConway, John R. McCune, Jos. W. Marsh, L. A. Osborne, Guy E. Tripp, H. H. Westinghouse.

COLUMBIA ENGINEERING WORKS
Designers and Builders of
WOODEN SHIPS



PORTLAND - OREGON

Peninsula Shipbuilding Company
BUILDERS OF SHIPS

General Office and Yards, Foot of McKenna Avenue
PORTLAND, OREGON

We welcome the opportunity of submitting competitive
bids on the plans of any ship which can be built of wood

Ships under construction for our own account
on ways and for sale

We use Douglas Fir for ship construction
It has buoyance and strength

LARGE FIRM OPENS LOCAL OFFICES

The opening by A. O. Andersen & Co. of an office in San Francisco is a matter not only of interest to San Francisco shipping people, but also to the entire Pacific Coast shipping interests, as in future the business covering Pacific Coast interests, which has hitherto been conducted by A. O. Andersen & Co. through their New York house, will now be carried on by the San Francisco office in direct cable communication with their offices in Copenhagen and Christiania. In these days of cable delays, the value of this arrangement should appeal to all, as by this arrangement the delay in communicating with New York has been entirely obviated.

The establishment of the San Francisco offices of A. O. Andersen & Co. should be of considerable assistance to Pacific Coast shippers, as the Andersen firm not only own a large fleet of steamers and sailing vessels themselves, but, through their Christiania office, control the chartering of quite a considerable amount of Norwegian tonnage, as is evidenced by the results obtained by this firm since their opening of their first offices in the United States the latter part of 1915. In November of that year the New York office was established under the management of Mr. Arnold Reimann, President, and Mr. Frank K. Hitching, Vice-President, and very quickly a permanent business was built up, resulting in the situation today that, through the New York office, as brokers for various Norwegian owners, contracts for the building of not less than thirty-five steel steamers, valued at over $30,000,000.00, were placed by them between January and October of 1916.

All but seven of these contracts were placed on the Pacific Coast, and many of the vessels referred to are now at sea, notably the following: "Golden Gate," 7500 tons; "Capto," 7100 tons; "Thordis," 7100 tons; "Talabot," 10,000 tons; "Bessa," 10,000 tons; "Niels Nielsen," 8800 tons; "Hanna Nielsen," 8800 tons; "Luise Nielsen," 8800 tons; "Stolt Nielsen," 8800 tons; "Key West," 7500 tons. And other vessels are due for delivery during this year.

The chartering of the vessels at sea and most of those still to be launched is in the hands of the San Francisco office of this firm, and, as most of these vessels are at present being kept in trans-Pacific trade, this fleet is worth the attention of the Pacific Coast shipping firms.

Early in May, 1916, it was decided to open an office on the Pacific Coast, with the result that the Portland office was established, which office rapidly achieved results. The yard of the McEachern Ship Co. was acquired for the building of wooden ships, and a number of these vessels were built and subsequently sold, and the yard has now been sold to Mr. Houser, Portland's grain magnate. An interest in shipbuilding, however, is still retained by A. O. Andersen & Co., they also having an interest in the Albina Machinery & Engineering Works, and they are now constructing several steel vessels and may be open to considerable further contracts at a later date.

The Portland office is also carrying on an extensive import and export and general merchandising business under the supervision of Mr. Chas. E. Edwards, who was for many years actively engaged in this business in various European and Oriental centers.

The newly formed San Francisco office of this firm is in charge of Mr. Frank K. Hitching, who has resigned from the managership of the New York office to take up the position here in San Francisco. Under Mr. Hitching's personal supervision will be the handling of all of Andersen's interests on the Pacific Coast, in so far as the buying and selling of steamers and sailing vessels is concerned, and the chartering of the vessels referred to above and other vessels which they are from time to time able to obtain through the activities of their Christiania house, which has for many years been established in the shipbrokering business in Norway and which has a very extensive connection among Scandinavian shipowners. There is little doubt that this house should be able to build up a permanent shipbrokering business, covering Scandinavian and other tonnage, which should be of great value to charterers here.

The San Francisco office is also conducting a considerable import and export business under the able management of Mr. A. B. Moulder, who has been for many years in Hongkong and other Oriental cities, and who is thus thoroughly conversant with this end of the business. They have direct connections in the Orient and Australasia and are thus in the best position possible to handle all Oriental products. After the war, with their own Scandinavian houses and the vessels that they own and control, their export and import business with Denmark, Norway and Sweden should be a factor in the trade of this port.

The fact that A. O. Andersen & Co. have been able in such a short time to build up such an extensive business throughout this country should be an assurance to all who may deal with them of their strong financial and commercial standing, and the policy followed by the Directors of this firm up to the present time should indicate still further developments when conditions are more propitious.

Mr. Frank K. Hitching

Yoke forging for a large Great Lakes stone carrier.

C. F. Braun & Co.

MANUFACTURING
MECHANICAL
ENGINEERS

Office: 503 Market St.
Works: 757-759 Folsom St.
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MANUFACTURERS:

B Feed Water and Service Heaters
R Oil Heaters and Oil Coolers
A Evaporators and Distillers
U Cloth Feed Water Filters
N Twin Strainers

B Condensing Apparatus
R Centrifugal Pumps
A Expansion Joints, Anchors, and Guides
U Cooling Towers
N Water Filters, Softeners, and Sterilizers

"The Standard of the Pacific"
(MADE ON THE PACIFIC COAST)

THE FORD TRIBLOC

Good Reading on Good Hoists

A SUCCESS is always worth reading about. Especially so when it is of the Longfellow variety—the kind that attains the heights by forging ahead while others slumber.

There's a big idea behind the success of **Ford Tribloc Chain Hoists.** The idea of getting better service out of a hoist by putting better materials and features into it. All-steel working parts, non-gagging LOOP Hand Chain GUIDE, planetary type of spur gearing—those are some of the meritorious features of Ford Construction.

They are worth reading about in detail in our new Catalog. How shall we address it?

Ford of Philadelphia

FORD CHAIN BLOCK & MFG. CO.
137 Oxford Street, PHILADELPHIA, PA.

2083-D

REVIEWS

The Port of Los Angeles

The foreign trade and industrial opportunities of Los Angeles, together with the annual report of the Board of Harbor Commissioners, is a handsome publication of considerable value on account of the large amount of data it contains, not only about San Pedro harbor, but also concerning opportunities the world over for the Los Angeles exporter and importer. Although slightly colored with a dash too much of the Los Angeles "spirit," this publication is well worth the consideration of shipping men.

A New Service

No event can be of more interest to the industrial world than the recent organization and incorporation of the Industrial Sites Association of America, with offices at 115 Broadway, New York. The entrance of this association into a new field of action, solves a problem of long standing for manufacturers who are in quest of new locations.

There are in many parts of the United States any number of cities and towns possessing many superior facilities and natural resources, admirably suited for manufacturing and other industrial purposes. Scarcity of desirable locations is no part of the manufacturers' problem. Their great lack has been a central source of information which would enable them to put their fingers on just what they wanted without traveling from city to city and town to town, spending thousands of dollars and months of valuable time in a fruitless search for factory sites measuring up to their requirements.

The I. S. A. A. has undertaken to meet this need by compiling and classifying data concerning the properties, sites, buildings, railroad and water facilities, labor conditions, population, etc., of all towns and cities where manufacturing plants could be advantageously established—a Clearing House which would supply manufacturers with COMPLETE AND VERIFIED INFORMATION free of charge.

Boards of Trade, Chambers of Commerce and similar commercial bodies are co-operating with the Association in bringing its service to a high level of efficiency. Wherever there is a building or a piece of property for sale or for lease, a full description is filed with the Association, and when properly verified and found suitable for manufacturing purposes, it is listed. Every detail has to be certified to, as a safeguard against misrepresentation. Manufacturers can depend on the accuracy of all information supplied.

By simply stating their requirements manufacturers will be rendered every assistance in the location and selection of properties. They will be given free access to all data in the possession of the Association. The entire service is offered without charge of any kind.

Chas. D. Durkee & Co.

The latest catalog of this concern consists of 978 pages of carefully arranged information relative to a full line of marine hardware, motorboat and yacht supplies and ship chandlery. Among the interesting lines described are signal flags, burgees, house flags, etc., all illustrated with handsome colored plates. There is a chapter on the uses of flags, also the full text of the U. S. motorboat law, regulations for power boats in the Canal Zone, U. S. regulations applicable to rivers and narrow channels and the motorboat laws of New York State. The catalog is very completely cross-indexed so that any desired fitting can be found in a moment. In keeping with the spirit of the times, the last pages of this catalog are given over to the words of patriotic and battle songs.

Japan

The Toyo Kisen Kaisha's new travel magazine "Japan" is a splendid bit of work considered from every point of view. The reading matter is extremely well chosen and the general tone of the publication is suggestive of the Orient. The Toyo Kisen Kaisha's publications have always been of a high order, but their new magazine "Japan" sets a high standard of excellence in its first number.

The "Frisco Standard" Book of Boats. This is a very handsomely gotten up pictorial review of the Standard Gas Engine Company's activities in the marine field. The book is divided into twelve sections, as follows: Motor freight boats, trading schooners, salmon purse-seiners, gillnetters and trollers, tuna fishing boats, motor cannery tenders, motor fishing schooners, motor cruising yachts, motor tugboats, motor passenger boats, public-service boats, and miscellaneous types. To anyone interested in motor power boats of any description, this book will prove intensely interesting. Copies may be had upon request from the Standard Gas Engine Company.

"Car Utility Bulletin No. 5." How car space is wasted by the practice of shipping commodities in single trade units is graphically shown in a car utility bulletin just issued by the Transportation Department of the Pennsylvania Railroad. The bulletin is illustrated with a series of seven diagrams showing the customary ways in which tomatoes, fertilizer, sugar in bags, sugar in barrels, salt in bags, oil in barrels and cotton in bales are shipped. In the case of each of these commodities, the commercial unit in which shipments are ordinarily made fills half, or less than half, of the carrying capacity of a box car. The diagrams show how practically the entire capacity of the car can be utilized. To remedy this condition, the bulletin suggests that buyers, where possible, increase orders to carload lots or club together with other buyers. Shippers are urged to encourage larger trade units and solicit buyers to increase or combine their orders, so as to fill the car. "When this is not possible," says the bulletin, "then you should combine carload shipments which are destined to the same point, and when you have shipments that are going in the same general direction, they should also be combined in order to make full use of car space. If the wasted space in the freight cars on the Pennsylvania Railroad system was utilized, the result would be equivalent to placing more than 120,000 additional cars at the service of the country.

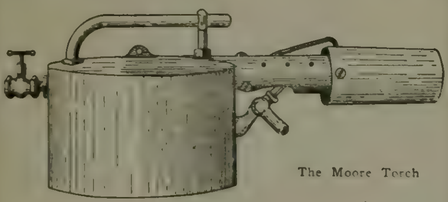
A NEW CUTTING FLUID

Mr. Philip Feldman, President of the Mount Hood Soap Company of Portland, Oregon, has been at work for many months perfecting a cutting and cooling liquid for use on machine tools. The result has been a compound in which machine shop managers are taking great interest on account of the remarkable results obtained. In the preparation of the liquid, oil is mixed with water by a secret process.

It is claimed that the Mount Hood preparation permits of tools being operated at higher cutting speeds than can safely be used with other cutting oils, that it does not rust or gum metal, enables the tool to cut clean and smoothe, does not become rancid and is non-combustible. The lubricant is a water soluble oil which is prepared in concentrated form and may be diluted in from 10 to 40 times its volume in water. A remarkable saving in cost over ordinary cutting oils is also claimed for this new material, which is now being widely used in the Northwest.

The Western Transport Company has been incorporated in San Francisco with a capital stock of $450,000. The incorporators are R. H. Swayne, P. H. Thayer, J. B. DeGolia and James F. Craig.

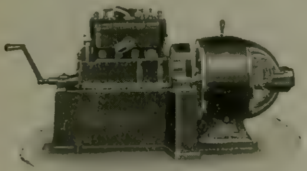
The San Francisco home of "Waterbury" rope.



The Moore Torch

Burns kerosene, crude oil and does not form carbon. The oil is not under any pressure. No preheating required; gives a clean blue flame 10″ to 36″ long, 2200 degrees Fahr.

Motorships, sailing ships, towboats, dredges, yachts, houseboats and launches should be electrically lighted.



The Langstadt-Meyer direct-connected lighting sets are built just for such requirements and can be operated by any ordinary person, not requiring an expert mechanic. They are well adapted for wireless installations, searchlights and general illumination. Send for bulletin.

Ships' Plans and Specifications Superintendence

We are Western representatives for the "Blackmer" Rotary Pump, an ideal tank or bilge pump. This pump is made up in all sizes from ¾″ to 6″ suction, it is the only rotary pump with a removable liner, enabling complete repairs to be made without dismantling and taking it to a machine-shop. These pumps are driven by belt, oil engine or electric motor.

Eckliff Boiler Circulators

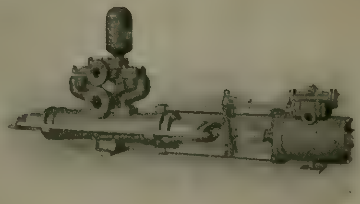
Amalgamated Paint Company's compositions, standard the world over.

Let us quote you prices.

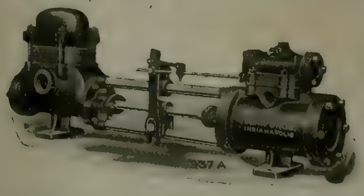
Crisp Engineering & Equipment Co.

24 California St.,

San Francisco, Calif.



SINGLE STYLE OUTSIDE PACKED DOUBLE ACTING POT VALVE PLUNGER PUMP



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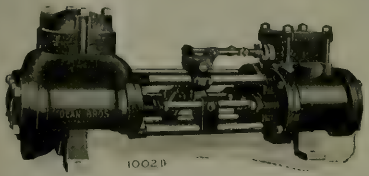

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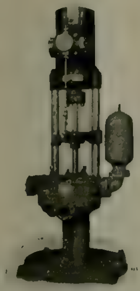

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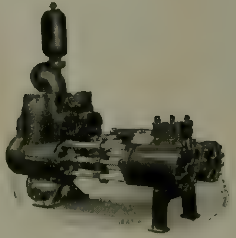

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PACIFIC MARINE REVIEW

AUGUST 1917

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PACIFIC
MARINE REVIEW
The National Magazine of Shipping

VOL. XIV, No. 8 SAN FRANCISCO AUGUST, 1917

The American Shipbuilding Company

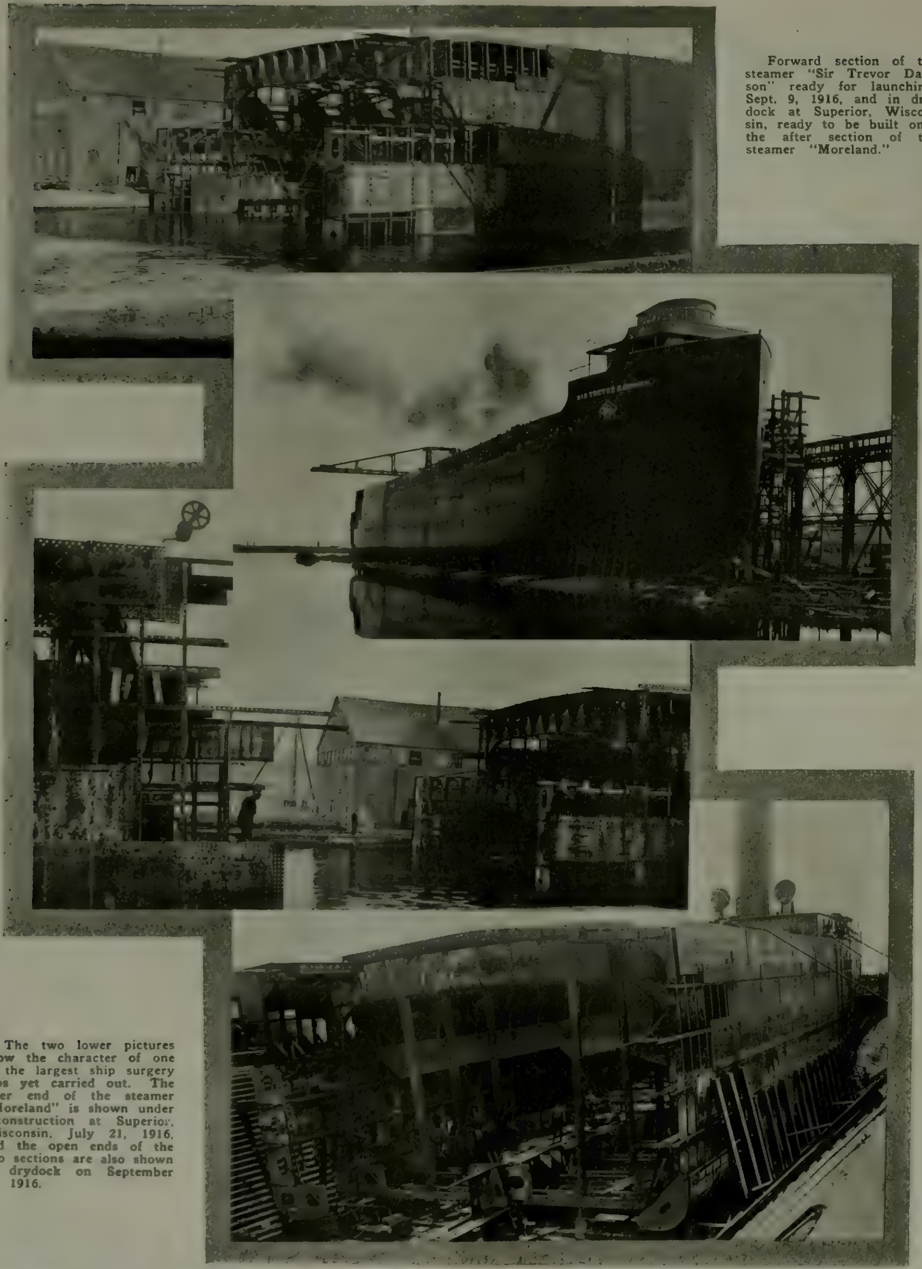
TO most people the Pacific Slope, and especially the State of California, is the land of rapid and enormous development. The romance of gold has attracted a more general interest than the story of iron, and in consequence the remarkable rise of the Great Lakes region to wealth and power has not received the recognition it deserves. The transition which has taken place during the past sixty years in the territory surrounding our Inland Seas has been made possible by the development of transportation by water.

The era of wooden shipbuilding on the Great Lakes preceded the incorporation of the American Shipbuilding Company and of most of its constituent companies, but the growth of shipbuilding in iron and steel is largely a part of their histories. Much of the originality in types and all of the successful economies practiced by Lake builders spring from the necessities or results of the ore trade; indeed, the rapid development of the bulk freighter furnishes an accurate measure of the prosperity and expansion of industry in the Great Lakes region. Some of the constituent companies of the American Shipbuilding Company were responsible for much of the pioneering in the development of the types now in use, and the present company has been identified with all the forward steps made since its incorporation in 1899.

The incorporation of the American Shipbuilding Company formed a consolidation of nearly all the important yards on the Lakes, and was brought about to secure, and in effect did secure, a more economical and better output. Planning, administration and control for the various yards were centralized to as great an extent as seemed prudent; while to the saparate plants was left only the actual work of construction. The plants in operation at the present time are as follows: the Globe Iron Works at Cleveland, Ohio; the Ship Owners' Dry Dock Company at Cleveland, Ohio; the American Shipbuilding Company at Cleveland, Ohio; the American Shipbuilding Company at Lorain, Ohio; the Detroit Shipbuilding Company at Detroit, Michigan; the Detroit Shipbuilding Company at Wyandotte, Michigan; the Chicago Shipbuilding Company at Chicago, Illinois; the Milwaukee Dry Dock Company at Milwaukee, Wisconsin; the Superior Shipbuilding Company at Superior, Wisconsin, and the Buffalo Dry Dock Company at Buffalo, New York.

The Cleveland plant has an area of about nineteen acres, with a frontage of about 2500 feet, on the Cuyahoga river, and is situated about half a mile from the mouth of that stream. The main offices of the American Shipbuilding Company are located at this plant. Three drydocks are maintained at Cleveland, and all the necessary facilities and equipment for building and repairing ships, including brass and iron foundries, machine shops, blacksmith shop, copper and tinsmith shops, patternmaker's shop, plater's shed, joiner shop, sawmill, mould loft, building berths, boiler shop, shear legs, cranes, delivery trucks, motor launches, etc., and the large general offices.

At Lorain, about thirty miles west of Cleveland, is located the largest yard of the Company. It has an area of forty-three acres, with a long frontage on the Black river, and is, in a sense, two yards, as there are two complete punch sheds, two shear legs, and two mould lofts, each operated independently. The boiler shop, which is one of the largest in the country, is 200 by 110 feet in size, and the machine shop 240 by 110 feet. The largest boring mill is 14 feet 2 inches in diameter by 10 feet high, and there is a planer 14 feet 2 inches wide, 25 feet long, and 10 feet 6 inches high. The shear legs have lifting capacities of fifty and ninety tons, respectively. There are four building berths and two drydocks capable of accommodating larger ships than have yet been built on the Great Lakes. The forge shops are especially large and complete-



Forward section of the steamer "Sir Trevor Dawson" ready for launching, Sept. 9, 1916, and in drydock at Superior, Wisconsin, ready to be built onto the after section of the steamer "Moreland."

The two lower pictures show the character of one of the largest ship surgery jobs yet carried out. The after end of the steamer "Moreland" is shown under reconstruction at Superior, Wisconsin, July 21, 1916, and the open ends of the two sections are also shown in drydock on September 16, 1916.

ly equipped for handling heavy forgings. All the tools in this plant are driven by independent motors.

The plant at Detroit is especially adapted to the construction of high-class passenger steamers. The boiler shop, machine shop, sheet metal shop, foundry, joiner shop, brass shop, drydock and shear legs are at Detroit, but the shipyard is at Wyandotte, about fifteen miles below Detroit on the Detroit river. At the latter plant the hulls are built and launched and then towed to Detroit to receive machinery, joinery, etc., and to be fitted out complete ready for service. The brass works at the Detroit plant are remarkably complete, and here brass goods of all kinds for general as well as marine uses is produced. At this plant have been built most of the elaborate passenger boats for which the Great Lakes are justly famous, and

The "Gilsa," a Norwegian freighter of canal-lock size, built by the American Shipbuilding Company.

also many vessels of all kinds for general use.

The Buffalo plant, which is located at the lower or eastern terminal of navigation for large vessels on the lakes, is particularly adapted for repair work. The buildings and yard cover an area of fifteen acres, and the plant consists of machine shop, joiner shop, 84-ton shear legs, building berth and three drydocks, with all the usual equipment of a large repair and construction yard. At this plant vessels going to salt water which are too large to pass through the Welland and St. Lawrence river canal locks are cut in two and bulkheaded so as to pass through in two parts. This yard is also used for "lengthening" jobs where vessels are cut in two and an additional piece built into them.

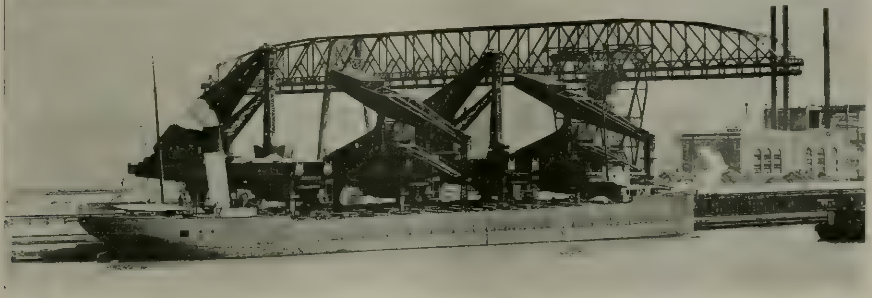
The Chicago Shipbuilding Company occupies an area of twenty-three and one-half acres on the Calumet river and is completely equipped both for new construction and repair work. There are two large building berths and two drydocks, of which the larger is a concrete structure 700 feet long. The shear legs at this plant have a capacity of 100 tons.

At Superior, Wisconsin, on the St. Louis river, is the plant of the Superior Shipbuilding Company, consisting of thirty-eight acres of land with machine shop, punch shop, etc., and all necessary equipment, including two building berths and two drydocks. This yard is at the extreme head of Lake Superior and is the only American yard on that lake. In connection with the plant at Superior there is operated a large steamer which serves the purpose of a portable repair yard. She is equipped with an electric welding plant, acetylene cutter, punches, shears, grinder, pipe cutter, lathe, drills, etc., and a powerful derrick. This craft has performed much important work in the nature of relief repairs as well as ordinary repair work.

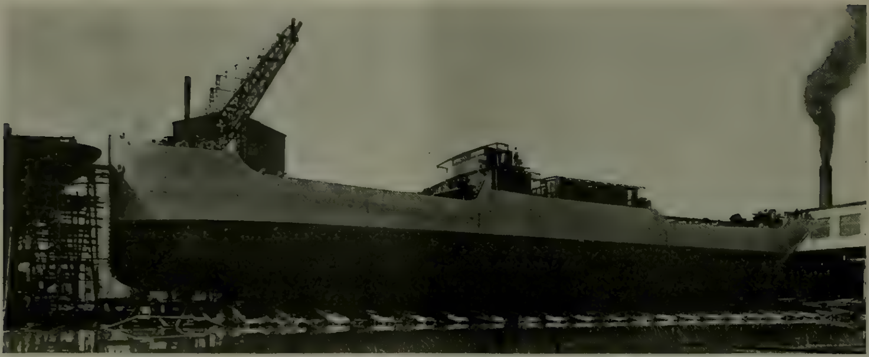
The Milwaukee yard consists of the South yard on the Kinnickinnic river and the West yard on the Menominee river, with a combined area of about 12 acres. There are in all, three building berths and two drydocks. Both plants are completely equipped for making repairs. The combined area of all the plants enumerated above is about 175 acres.

Since its consolidation in 1899, the American Shipbuilding Company has designed, built and equipped ready for service about 600 vessels, in addition to carrying on a general engineering and repair business embracing designing and constructive activities of a very complex character; the major work, however, has always been shipbuilding and marine engineering.

Unfortunately, the limitations of canal locks have prevented the building of large ocean-going vessels, and the American Shipbuilding Company has been compelled to limit the size of such vessels to a length over all of 261 feet and a breadth moulded of 43 feet 6 inches. Larger vessels can be built, cut in two parts, towed to tidewater, and put together again, but this is a rather expensive process. It has often been resorted to, however, in the case of lake steamers which have been bought for use on the Coast, and during the present demand for bottoms many lake steamers have been cut in two and taken to salt water. At the present time some thirty canal-size steamers are being constructed for salt-water service. These are all sister ships, 261 feet over all, 251 feet between perpendiculars, 43 feet 6 inches breadth moulded, and 20 feet moulded depth, and being single-deck vessels with full poop, bridge and fore-



View showing buckets, unloaders and ore transporter over ore piles on a dock. This type of cargo-handling machinery has been brought to the highest state of perfection on the Lakes. The Welman-Seaver-Morgan Company has a large number of highly successful ore and coal rigs of this character to its credit.

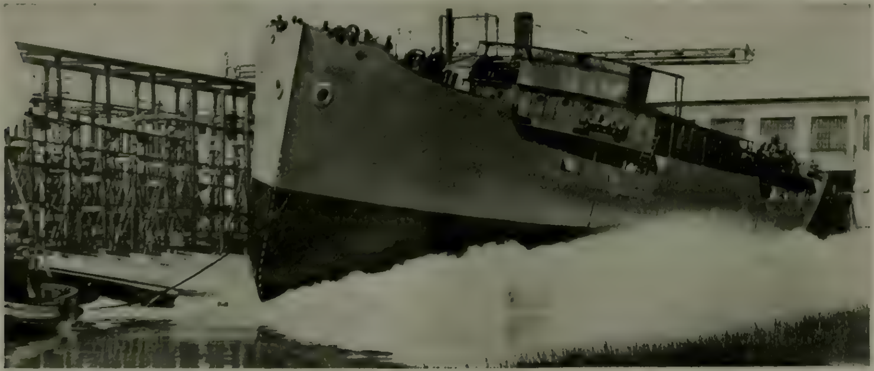


A salt-water steamer 261 feet over all, 251 feet between perpendiculars, 43 feet 6 inches beam and 20 feet moulded depth, ready for launching.

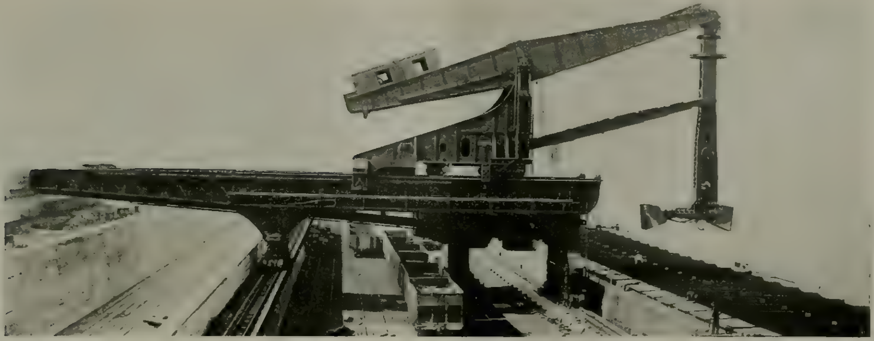
castle. They are propelled by single triple-expansion engines with cylinders 20, 33 and 54 inches in diameter by 40 inches stroke developing some 1200 horse power and giving a speed of from nine and one-half to ten knots loaded. Steam is supplied by two three-furnace Scotch boilers 14 feet 6 inches in diameter by 11 feet long working at 180 pounds pressure. Cargo is handled through four hatches 22 feet long and 18 feet wide. Two masts are fitted, one between each pair of hatches, and there are two 7 by 12 inch winches and two forty foot booms to each hatch. These vessels are built to Lloyd's highest class under special survey and are a very good type of ship for general cargos and lumber in the coasting trade.

A great number of vessels have been built for the canal trade; these craft pick up freight at the Lake ports and take it down through the canal to Montreal, Quebec and other places on the St. Lawrence River. Occasionally one of them has been overhauled and converted into a coasting steamer for use on salt water. They do not, of course, do nearly as well as do steamers designed especially for that business and are at best makeshifts. Some of this type of vessel are built to salt water requirements.

The bulk freighters constitute a type peculiar to the Great Lakes and this type is the most conspicuous. This class of vessel attained its maximum size in the steamer "W. Grant Morden," 625 feet long with a capacity of 13,000 gross tons on a draft of 19 feet. Her grain capacity is 500,000 bushels. These steamers, in the present stage of their development, have numerous close-spaced hatches to facilitate loading and unloading. At the loading docks the ore shoots are spaced on 12-foot centers and it is now the general practice to space the deck hatches the same distance and these are made nine feet wide in the direction of the ship's length and there is a three foot space between every two hatches. A system of hatches 12 feet wide and spaced 24-feet centers is better for unloading and some owners adopt this spacing, but such an arrangement requires shifting at the loading berth and in consequence the majority of the bulk freighters have the nine foot hatches spaced on 12 foot centers. All the steamers now built have metal hatch covers of flanged plates which slide one over the other and cover the hatchways. A tarpaulin must be battened over these covers to make them water tight. The large size freighters now building are usually 600 feet long over all, 580 feet between perpendiculars, 60 feet moulded breadth and 32 feet moulded depth; such a vessel carries 12,000 gross tons on a draft of 20 feet and has a cubic capacity of about 580,000 cubic feet. There are 35 hatches, each 38 feet by 9 feet in the clear. The hold is divided into three by two thwartship bulkheads while the double bottom is deep and extends well up the sides of the ship. The tank top is made very heavy and plated flush so that there will be no butts or laps to catch



Side launching of one of the large number of small salt-water freighters building at the yards of the American Shipbuilding Company.

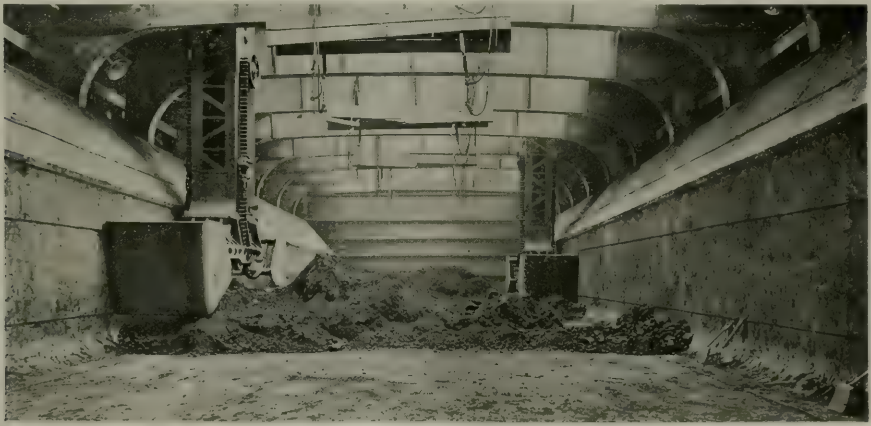


One of the big ore unloaders over a freighter. The mechanism traverses, in both directions, raises and lowers.

the lips of unloader buckets. The sides of the hopper bottom plumb the edges of the hatches. No winches for handling cargo are fitted, but there are usually three hatch engines for drawing the hatch covers and six mooring winches for handling the wire lines used to make the vessel fast. These winches keep a strain on the lines and allow movement of the ship both from the dock and parallel to it, this freedom of movement being necessary in using the great mechanical unloaders. The tendency of these winches is always to return the vessel to her original position. Accommodations on these freighters are very elaborate as compared with the usual practice for freighters on the ocean. This fact is true especially in the accommodations for seamen and firemen. The men are well fed and well housed in large and well equipped rooms. This is easily accomplished as there is so much room in the ends of these ships which is of no use for any other purpose.

These freighters are usually fitted with one triple expansion, jet condensing engine with cylinders 24½, 41 and 65 inches in diameter by 42 inches stroke, developing 2000 indicated horse power and giving a speed of about 12 miles. The bilge, cooler and air pumps are driven off the main engine; the other pumps being independent. The boiler plant usually consists of three two-furnace, single ended Scotch marine boilers about 13 feet 6 inches in diameter by 11 feet long and working at 180 pounds pressure. The Ellis and Eaves or the Howden system of forced draft is usually fitted. The ballast arrangements are exceedingly complete and well arranged. There is usually an 8 inch main to each compartment and these are often lead to a double manifold which enables any one tank to be pumped to any other. There are usually two large centrifugal ballast pumps and two large piston pumps. The feed pumps are independently driven. Almost all the recent vessels have been built on the Isherwood system of longitudinal framing which is well adapted to their structural needs as they are very long in proportion to their depth.

The general freighting business on the Great Lakes has developed a distinct type of vessel known as package freighters. These craft are often of considerable size. Like most local steamers their engines are in the run and their pilot houses are just abaft the bow. The later steamers are about 400 feet long, 50 feet beam and 30 feet deep. Much of their freight is tucked on board through side ports, a method of loading which is much more easily accomplished on the Lakes than on the sea board, as there is no rise and fall of tides to contend with. These vessels are fitted with cargo hoisting gear peculiar to themselves. A shaft with drums on it, one opposite each hatch



Unloader buckets in the hold of an ore steamer. It will be noted that the plating is laid flush to avoid fouling the lips of the ore buckets.

and cargo port, runs under the weather deck and is operated by a vertical engine at the after end. By means of clutches the drums are thrown in or out of gear and are used to whip the cargo out of the lower hold to be wheeled ashore. There are a number of variations of this gear, all of which are very successful.

This type has been further developed into a class of screw-propelled passenger and freight steamers which have been very successfully used on the Lakes. In these vessels the tween decks and lower holds are used for cargo and a great, light superstructure is built on top of the hull proper to afford accommodations for passengers during the short passenger season. The accommodations on these craft are very well laid out and exceedingly comfortable and they offer an unsurpassed and luxurious way of seeing the Great Lakes.

Twelve car ferries, carrying from twenty-eight to thirty-six cars each, have been built by the American Ship Building Company. These are very heavily built as they run through the Winter and have to operate through very heavy ice. Some of these craft are of considerable size. The "Pere Marquette No. 17" for instance, being 350 feet long, 56 feet wide and 19 feet 6 inches deep. The cars are run on board through the stern into the lofty tween decks and are taken off the same way.

Another type of freighter which the local requirements of the Great Lakes region are rapidly developing is the conveyor steamer for carrying lime stone, coal, etc. The holds of these vessels have sloping bottoms ending in pockets with doors discharging onto conveyor belts which run the full length under the hold and discharge onto a bucket ladder which elevates the rock to an elevated hopper, which, in turn, discharges onto a conveyor belt carried on a boom; this last belt delivers the cargo on the dock at a distance of ninety feet from the vessel's side. These conveyor ships unload with great rapidity, almost two thousand tons per hour not being unusual.

Passenger traffic by water is a large and ever increasing factor in Great Lakes transportation. During the warm summer months travel on the water is comfortable and refreshing, while rail travel is most unpleasant. This condition led to the building up of fleets of large fast passenger steamers, built both for day and for night runs. The paddle steamer "See and Bee," running on the Cleveland-Buffalo night service, is the finest example of lake passenger steamer yet built. She has also the distinction of being the largest paddle steamer in the world. Her dimensions are: length 500 feet, breadth over guards 96 feet 6 inches, breadth moulded 58 feet, depth moulded 22 feet 10 inches. This great craft is licensed to carry three thousand passengers. There are 470 state rooms and 24 suites, besides all the public rooms necessary for so large a passenger list. The interior of this vessel is very elaborate in the matter of appointments and decorations some of the interiors being especially fine. A complete automatic sprinkler system and automatic fire doors guard her against danger from fires. She is propelled by an inclined three-cylinder compound engine with cylinders 66, 96 and 96 inches in diameter by 108 inches stroke which develops 12,000 horse power. Steam at 165 pounds is supplied by three double-ended and six single-ended Scotch marine boilers and the craft makes a speed of 24 miles per hour. She represents the latest and highest development of her type. A number of similar vessels, though not so large or fast, have been built by the American Ship Building Company, among these being the "City of Detroit 111," "City of Cleveland" and "City of Buffalo."

A number of tankers have been built by the American Ship Building Company, both for Lake service and use on salt water. Those for salt water are of necessity small to allow of their passing through the canal locks. Their cargo capacity is 1,000,000 gallons and they are 260 feet long, 43 feet beam and 25 feet deep, being of the usual tanker type with machinery aft. Those built for Lake service are, of course, larger. The "Renown" built some years ago has a capacity of 1,800,000 gallons and is 390 feet long, 52 feet beam and 25 feet deep. At present the Company has building at its Lorain plant, an oil tanker for the Standard Oil Company of Indiana; she is 434 feet long, 55 feet beam and 28 feet deep. Both of these Lake tankers are built on the Isherwood system while the smaller tankers are built on the transverse system.

A large number of small vessels have been built at the various plants of the Company, including fishing vessels, tugs, sand suckers, barges, coal scows with machinery for rapid bunkering, sternwheel river steamers, small passenger and excursion boats, revenue cutters and in fact almost every kind of craft with the single exception of war vessels. In addition to this extensive and varied output, the different plants of the company have carried on a large repair and general engineering business.

At the present time the American Ship Building Company is constructing two sea-going tugs for the United States Navy, thirty-five small freighters for salt water service, four large bulk freighters for use on the Great Lakes, one large tanker for fresh water service and one large conveyor steamer.

PERSONALS

MR. ROLAND NEPVEU, a representative of the French government, has been in the Northwest for the past few weeks examining shipbuilding establishments.

Mr. E. W. Wright retired from the post of manager of the Port of Portland at the end of June to take the position of manager of the Max H. Houser shipyard at Astoria, the McEachern shipyard.

With the resignation of Mr. Wright, who had occupied the position for two years, the office of General Manager of the Port of Portland was abolished and the new position of General Superintendent was instituted in its place. This new position will be occupied by Mr. Fred B. Pape, who has been working for the port authorities for about five years successively as mechanical engineer, master mechanic and finally as superintending mechanical engineer. Mr. Pape's duties will be practically the same as were those of Mr. Wright.

Mr. Frederick Toppin, formerly assistant to the president of the International Mercantile Marine Company and Mr. John H. Thomas, manager of the Boston branch of the concern, have been elected vice-presidents.

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THE COUNCIL OF NATIONAL DEFENSE

IN the stupendous task of preparing this country for war. the part taken by the Council of National Defense and particularly the Advisory Commission, has been little understood by the general public. The various accounts appearing in the daily press have been more or less misleading owing to their fragmentary character and their lack of sequence. This condition has given rise to the belief in some quarters that the Advisory Commission and its many committees were formed through patriotic impulses which resulted in the appointment of committees which were merely honorary in character, performing no clearly defined duties and resulting in neither much good or much harm as far as real preparedness was concerned.

How far such beliefs are from the actual facts is clearly shown in the general report from the Director of the Council of National Defense and of its Advisory Commission to the Chairman of the Council, the Secretary of War. On other pages of this magazine will be found extracts from this report and, while we cannot quote the document in full, enough is given to clearly show the remarkable work that is being accomplished.

That these two co-related bodies have been able to enlist in the services of our country such a splendid body of men as are represented on the various committees, that these men by the hundreds are giving either all or a large part of their time to the common cause without remuneration (many of them have moved their residences to Washington and paying their own expenses) must surely be proving a most disheartening answer to the German Government's belief that our country would prove itself to be a dis-United States.

CONCERTED ACTION PROMISED

THE work of the Shipping and Maritime Committee of the Pacific Coast Chambers of Commerce is now more or less definitely outlined, as will be seen from the resume of the first general report published elsewhere in this magazine. That this body can be of great service to the Shipping Board and other government bodies goes without saying, as the committee is composed of men who have a thorough knowledge of the needs of shipping and the needs of the shipper. In the one matter of securing sufficient navigating officers for the great emergency fleet of merchantmen now building in the United States there is room for the most urgent effort. The committee is committed to complete co-operation with any and every good nautical school on the Pacific Coast and is also enlisting the services of our universities in this regard. This is a matter of vital importance and one which must be met squarely.

When our government commences to commandeer ships in large numbers it is quite certain that there will be many mistakes made and that certain trades will suffer unduly. This is a condition that will prove inevitable and it is to be hoped that the helpful suggestions which the government will receive from such bodies as the Pacific Coast Committee will greatly lessen the trade distresses following the removal of many ships.

The mind of the successful shipping man is one that has been trained to anticipate a tonnage shortage, while the legislative mind of official Washington has been trained to investigate this same shortage after it has occurred and seek out a remedy,—a remedy, unfortunately, which is often not applied until the need for it has disappeared. Owing to this difference in vision, the advice of any body of trained shipping men cannot but be of great value to the government in cases where it is necessary to determine the minimum tonnage that is needed to preserve a reasonable and fair freight movement on any particular sea route.

Again, the man who is earning his daily bread by or through the activities of shipping has a vital interest in the future of our merchant marine. His future is wrapped up in the success of America on the sea after the close of the great war. This attitude will lead him to weigh carefully all temporary measures in the light of their effect on our maritime future and his advice on such matters will serve to keep temporary legislation of every description within the bounds of reason.

MOTHER FREIGHT SHIPS

ELSEWHERE in this issue will be found plans and a description of what might well be termed a "mother ship" for freighters. These plans were prepared by John L. Bogert, of New York, who has been taking a vital interest in the American emergency shipbuilding program. Mr. Bogert believes that adding fuel to the flames is no way to fight fire and his familiarity with ship design, both in steel and wood, and his sincere desire to be of help in the present emergency entitles his idea of a mother ship for freighters to the most careful consideration.

The plans accompanying Mr. Bogert's article call for something that is a radical departure from the ordinary, but in these days this feature does not engender the suspicion it would have done a few years ago. While the design of the ship itself is a departure from all ordinary conceived notions of the mariner, the idea is highly feasible; in fact, we see but one debatable point and that is concerning the ability of bulkheads and fifteen feet of cargo of a more or less shock absorbing character to overcome the effects of a torpedo explosion.

The point to be considered is, however, the possibility of overcoming the submarine by some other method than providing more ships to sink than the underseas craft have time to accommodate. On this phase of the question we must heartily agree with Mr. Bogert and we fully believe that the final solution of this knotty problem lies in the offensive and defensive properties of the ships that are built rather than in the attempt to outdistance destruction by construction. Whether or not Mr. Bogert has reached a satisfactory solution, he has opened in an able and comprehensive manner a new possibility and one that is worthy of receiving the fullest and most exhaustive study, as the final solution may be found along similar lines to those which he has indicated.

OIL MEN VINDICATED

THE oft-repeated contention of California oil operators that the Government's course anent the State's oil lands could only result in empty legal victories on one hand and state-wide and even national loss on the other, has been fully upheld in the report of the Petroleum Committee of the State Council of Defense. Governor Stephens of California received the report of this committee early in July and on the eighth of the month telegraphed the gist of the situation to Secretaries Baker, Daniels and Lane; to Senators Phelan, Meyers and Johnson; Representative Ferris, Attorney General Gregory, and Bernard Baruch, Chairman of the Raw Materials Section of the Council of National Defense Advisory Committee. President Wilson was also telegraphed as follows:

"Committee on Petroleum, California State Council of Defense, consisting of Max Thelen, President California Railroad Commission; Elliott Blackwelder, Professsor of Geology, University of Illinois, and David Folsom, Professor of Mining at Stanford University, have just presented to me conclusions and recommendations on California petroleum situation. Committee concludes:

"First: California petroleum essential to railroads and industries entire Pacific Coast and products thereof, including gasoline and lubricants distributed generally over the United States and exported to allies.

"Second: Consumption now outrunning production thirteen million barrels annually.

"Third: Available fuel oil now in storage will be exhausted in less than two years.

"Fourth: During war but little relief can be secured by substitution of other forms of fuel or power.

"Fifth: Remedy is large and prompt increase in production.

"Sixth: Serious shortage in drilling supplies exists and labor shortage threatened.

"Seventh: Major part necessary increased production can be secured by drilling on lands in litigation with Federal Government, but not otherwise.

"Chief recommendations of committee are:

"First: That production be increased promptly at least thirty-thousand barrels net daily.

"Second: That Federal Government be asked to assist in manufacture and transportation of oil well drilling supplies and in exempting skilled oil laborers from military service.

"Third: That lands in litigation with Federal Government outside naval reserves be promptly thrown open in drilling under stipulations protecting Federal Government and claimants.

"Fourth: That Federal Government review complete facts with reference to naval reserves.

"Fifth: That Federal Government adopt promptly constructive policy for developing such petroleum lands as government may deem consistent with public interests.

"Sixth: That as soon as present emergency permits every effort be made to utilize California petroleum most efficiently and to develop other forms of fuel or power.

"I endorse committee's conclusions and recommendations and respectfully submit them with earnest request that you render every possible assistance. Complete copy committeee's conclusions and recommendations being mailed tonight."

This is throwing an old light from a new angle on a much discussed and vitally important question. The government has been inclined in the past to regard the oil operator's arguments as prompted solely by self-interest. Naturally the operators wished to save investments made in good faith and without knowledge of infringement of any government right, but, intentionally or otherwise, their pleas accorded startlingly with state wide and nation wide needs. The personnel of the Petroleum Committee of the California State Council of Defense is such as to inspire the highest confidence, both as to ability and integrity. This committee's report makes no pleas for law-breakers or squatters on government oil lands, it does not ask that the government forgive the sinners in view of the crisis in the oil situation,—in fact, the committee found neither squatters nor sinners, or, if it did, this class of oil operator was too negligible to receive mention. What the committee did find, however, was a serious shortage of oil in the California reserve storage, also that the government oil land cases constituted the chief factor in creating this shortage and that the legal aspect of the government's claims in the naval reserve cases was such as to warrant a review of the complete facts relative thereto.

The report of the Petroleum Committee is a complete vindication of the stand taken by the California oil operators and the fact that in contending for what they see as mere justice to themselves they are also contending for something that is of vital importance to the state and nation in the present crisis will certainly serve to absolutely settle their cases in the court of public opinion.

The "Frances L. Skinner"

PERHAPS no salvage operation of recent years has held equal interest in the public eye with the long and finally successful efforts to float the stranded German steamer "Sesostris." Certainly no task of this kind ever presented greater difficulties and from whatever angle the task is viewed it presents new experiences and new accomplishments in the art of salvage.

The "Sesostris," or, as she is now known, the "Frances L. Skinner," is a single-screw steamer of 4,718 tons gross register and she was completed in Flensburg, Germany, in November 1897, being originally named the "Octavia" and later on being renamed the "Sesostris" when she became a part of the Kosmos fleet.

During the month of March 1907, while lying at Ocos, Guatemala, the vessel drifted onto the beach during the night and finally worked so far into the sand that all efforts made to float her at that time proved fruitless. It is believed that one of the shackle pins came out of the cable by which the vessel was riding, but whether from this cause or not, the "Sesostris" was hopelessly aground.

After lying on the beach for some months, the vessel was sold to Mr. Bruno Mijares, a resident of Ocos and the proprietor of the literage business of that port.

Mr. Mijares discharged the cargo of the "Sesostris" and made an effort to float the ship during the close of 1907 and the early part of 1908. This effort proving unsuccessful, the vessel lay on the beach for several years during which time the sand built up to seaward until she was eventually lying parallel to the water and fully three hundred feet from the high water mark.

In 1912-13 a salvage company undertook the work of floating the "Sesostris." These people scaled the vessel inside and out, the outside plating being cleaned from the rail down to the sand. The plating was then given a coating of red lead and bitumastic paint. The inside of the plating was cleaned from the main deck to the tank margin and also coated with red lead and bitumastic paint. The deck houses and bulwarks were treated in a similar manner and the engines were opened up and thoroughly cleaned and coated with white lead and tallow.

The efforts of this company proving fruitless, the "Sesostris" was left in the care of a watchman who turned the engines over by hand every day until the month of July, 1916, when the British Columbia Salvage Company commenced the work of salving the vessel, finally floating her on March 24, 1917. She was taken to Champerico under her own steam and unassisted and taking on fuel and water at that point she was moved to Salina Cruz, also under her own steam. At this port a further supply of coal and water was obtained and the steam tug "Nitinat," which had been sent down by the new owners of the "Sesostris" convoyed the vessel to San Diego. The entire voyage from Salina Cruz to San Diego consumed only twelve and a half days, despite high head winds and heavy seas and the fact that the "Nitinat" was only towing for three days. From San Diego to Victoria, the passage was made with the "Nitinat" towing and the "Sesostris" using her engines, the time consumed being only eight days and the steamer finally went from Victoria to Seattle under her own steam unassisted by tugs.

During the entire time the "Sesostris" was steaming between ports the engines worked smoothly, making from sixty to seventy revolutions and were not stopped for any purpose whatever, nor was it found necessary to use the water service on any part of the machinery or shafting.

On June 2nd, 1917, the vessel was finally docked at the Seattle Construction and Dry Dock Company's dry dock and the bottom and sides up to the fifteen foot water line were thoroughly cleaned and scaled. The scale on the plating was found to be one-eighth inch thick and was apparently a black carbon scale, which, when taken off, left the plates perfectly smooth. There was no pitting in any part of the vessel's bottom, the plating being fair and smooth over the entire length.

The hauling of the "Sesostris" from her sandy bed was a task of peculiar difficulty as the sand shifted back as quickly as it could be dug out. Finally lines of sheath piling were resorted to in order to hold the sand back, but even this proved a gigantic task as twice the piling was carried away by tropic storms. In pulling the big vessel through the sand until she was finally floated, the main dependence was placed on the ship's winches. Kedge anchors were securely bedded to seaward and the deck machinery of the "Sesostris" kept up a steady strain on the cables. At times the day's progress was measured in inches, at others the day's movement would be twenty or

The "Sesostris" being warped out through the surf at Ocos. The progress of the ship varied from a few inches to thirty feet a day.

thirty feet and again no progress would be made at all.

When it is considered that this vessel was on the beach for ten years the condition of her hull, engines and boilers is little short of marvelous. When placed in dry dock at Seattle, the bottom and sides were hammer tested from end to end and three lines of test holes were bored on each side. All the plating was found sound and of full thickness with the exception of one plate on the starboard side near the bow. A doubling plate was riveted on over this. With the exception of the forward fireroom bulkhead, a part of which had to be removed, all the transverse bulkheads were found in good condition. The tank tops and margin plates were in first class condition throughout and while the floors, intercostals and center girder required scaling they were all found to be of full thickness and the cement was intact throughout the bottoms. The stem bar, stern frame and rud-

In the sand, high and dry, 300 feet from high-tide mark, the "Sesostris" presented a peculiarily difficult problem.

From the shore side the "Sesostris" appeared to be out in the country, owing to the rank growth of vegetation which surrounded her.

der were all found in excellent condition, about the only work to do here being to rebush the rudder pintles. The deck houses were also in exceptional condition considering the circumstances and while the wood planking over the steel decks was removed and replaced, the work was comparatively small in quantity. Thrust, line and tail shafting was all in good condition and all the auxiliaries, with the exception of the feed pump, which was replaced, needed but a thorough cleaning and overhauling to place them in first-class condition.

In short, the new owners of the "Sesostris," now the "Frances L. Skinner," have secured a seaworthy steamer in first-class condition. Her ten years in the sand at Ocos appear to have had practically no effect upon the hull or engines so that while the "Frances L. Skinner" was built twenty years ago, as far as deterioration is concerned she is only ten years old.

A Good Start Made

THE first meeting of the Pacific Shipping and Maritime Committee of the Associated Chambers of Commerce of the Pacific Coast was held in Seattle on July 2nd with the following members present: Mr. J. C. Rohlfs, manager of the marine department of the Standard Oil Company, Chairman; Captain J. S. Gibson, president of the International Stevedoring Company, Seattle; J. S. Chilberg, president of the Seattle Trust Company; William Piggott, vice-president, Pacific Coast Steel Company, Seattle; J. J. Donovan, vice-president of the Blodel-Donovan Lumber Mills, Bellingham; H. L. Corbett, vice-president of the First National Bank, Portland; H. E. Pennell, vice-president of the St. Johns Lumber Company, Portland; B. F. Stone, president of S. Elmpre and Company, Astoria; C. W. Cook, manager of the American Hawaiian Steamship Company, San Francisco, and C. F. Converse of San Francisco, Secretary to the Committee.

The Chairman of the committee briefly outlined what had been accomplished at the preliminary organization meeting at San Francisco and the resolution passed at that time was read. The aims and objects of the committee were set forth as follows: "The Pacific Shipping and Maritime Committee is organized to assist the Government officials in the present necessary expansion of the American merchant marine, and to seek to be of value in developing that growth along such lines and under such conditions as will provide a permanent merchant marine that will carry American products in American ships into all the markets of the world, along shipping routes and under shipping conditions that will protect the prosperity of our manufacturers, farmers and working men during the business competition that will follow the close of the war."

The committee decided to take immediate steps to have an inventory made in Warshington, Oregon and California of everything that might later be of value to the U. S. Shipping Board and the Council of National Defense. This would include manufacturing plants and their possible output, shipbuilding plants operative and proposed, nautical and engineering schools and all matters relating directly or indirectly to the construction and operation of merchant vessels and the exportation and importation of raw products and manufactures. In making this inventory, each state is to be handled by the members of the committee within its boundaries, acting through various commercial bodies, representatives of the U. S. Shipping Board and the various State Councils of Defense.

It is the purpose of the committee to secure all possible data in relation to shipping and later to issue a pamphlet for the information and education of those not familiar with existing conditions surrounding our merchant marine. In this way it will be sought to stimulate a healthy interest in merchant marine matters.

An endeavor will be made by the committee to have similar organizations effected by the comcommercial interests in the Middle West, the Great Lakes, the Gulf and Atlantic Coast States and eventually to have all such committees formed into one national body.

In order to facilitate and hasten the work of the committee it was decided to divide the Pacific Coast into four sections, viz: Southern California, including Los Angeles, San Diego, etc.; Northern California, San Francisco, Oakland, and other Bay communities; Columbia River and Puget Sound. The members of the committee within each group will have a sub-Chairman. This would enable prompt action by each section on any question and general meetings of the committee would handle cases where there was disagreement between the sections. The Puget Sound district will include Alaska.

The Secretary's office at San Francisco will be a clearing house for information from whence all data submitted from a member of the committee or from outside sources will be transmitted to all members of the committee.

An effort will eventually be made to have all the states west of the Rocky Mountains act as a unit on all matters affecting the maritime welfare of the Pacific Coast. Another matter that will receive careful consideration is that of securing an adequate number of masters, mates and engineers for the large number of new boats building. The school ships recently acquired by California and Washington, state universities, nautical schools, both public and private, will all be encouraged in every legitimate way, as the officering of the merchant marine is a very serious problem.

It was also decided to use every effort to put a complete stop to the carriage of liquor on ships for sale to sailors. This question has already been satisfactorily settled by many of the larger steamship companies.

The visiting members of the committee expressed themselves as highly delighted with the splendid entertainment afforded them by the Commercial Club and Chamber of Commerce of Seattle and it was felt that a worthy start had been made in the great work which the committee has outlined for itself.

Proportional Dimensions at Terminals

By H. McL. Harding, Engineering Terminal Expert, New York State Barge Canals, New York, N. Y.

QUAYS are mostly confined to inland rivers or to locations where there is available a long waterfront.

A pier may be considered as two quays placed back to back.

As to the following principles there must be exceptions, as in cases where there is not sufficient land available or the appropriations are not sufficient.

Quays

To attain the best results where possible the desired width or depth of the property for a quay terminal can be about 400 feet.

Almost without exception there should be railway tracks and a drayway between the shed and the quay wall.

For this width the space may be divided as follows:—

Frontage or the area between the face of the quay wall and the front of the shed..	45 feet
Steel shed, parallel to water front, width....	60 feet
Width between shed and parallel warehouse	60 feet
Concrete warehouse width	80 feet
Space rear of warehouse	55 feet
Track space for car storage	100 feet
	400 feet

Where less width is available, as 250 feet, it may be advantageously divided as follows:—

Frontage	35 feet
Shed	50 feet
Between shed and warehouse	50 feet
Warehouse	70 feet
To the rear of warehouse	45 feet
	250 feet

Provision may be made for storage tracks at the end or the ends of the terminals, or on some rear areas.

Where there is even less area, the width of the shed may be reduced to 40 feet, and additional shed capacity can be economically obtained vertically and not horizontally.

When there is less than 200 feet, the warehouse can be placed elsewhere, as to the rear of the open or coarse freight storage area.

In this case the division can be:

Frontage	35 feet
Open storage area	40 feet
Car tracks	35 feet
Warehouse	70 feet
Total	180 feet

The above will serve to indicate, in laying out quay terminals, the area necessary for successful operation.

A narrow strip along the waterfront can be advantageously utilized for a terminal by making use of vertical space instead of horizontal.

Land to the rear of public roads or of lines of railway tracks can be utilized advantageously for warehouses by installing overhead carrier connections.

Piers

At basins of inland waterways, it is often advisable to install piers on account of the water frontage being limited or for concentrating the terminal works.

If the pier be 350 feet in length to accommodate a barge 300 feet long, 40 feet wide, the width of the pier should be 125 feet. The slip 180 feet wide, the shed 300 feet long, 60 feet wide, and 30 feet clear height beneath the roof trusses. Provision is here made for four barges abreast.

If the pier be 675 feet in length to accommodate two barges in tandem, on each side of the slip, and four (4) abreast with a bargeway between for the barges, the width of the pier should be 150 feet, the slip 225 feet wide. Sheds (300 feet long), there being two sheds in tandem, each 80 feet wide, 30 feet clear height below the girders.

For a pier 1000 feet long, the width of the pier should be 170 feet, the sheds, three each 300 feet long, 80 feet wide, 30 feet high below the girders, and machinery for tiering and for transverse and longitudinal movements.

Conclusions

Pier 350 feet long, 125 feet wide.
Slip 180 feet wide.
Shed 300 feet by 60 feet by 30 feet.
Pier 675 feet long, 150 feet wide.
Slip 225 feet wide.
Shed 2 (300 feet) by 80 feet by 30 feet.
Pier 1000 feet long, 170 feet wide.
Slip 225 feet wide.
Shed 3 (300 feet) by 80 feet by 30 feet.

For ocean freighters at marine terminals the dimensions should be:

Pier 600 feet long by 150 feet wide.
Slip 250 fet wide.
Shed 500 feet by 80 feet by 30 feet.
Pier 1200 feet long, 170 feet wide.
Slip 350 feet wide.
Shed 2 (500 feet) by 80 feet by 30 feet.
Pier 1200 feet long, 250 feet wide, for two sheds abreast.
Slip 360 feet wide.
Sheds two abreast with a pier between, two tandem, four in all, each 500 feet long by 80 feet by 30 feet.

By making a shed 30 feet high its usual capacity can be trebled.

This means that such a shed, utilizing high tiering with 80 feet in width, is equal to a shed 240 feet wide tiering five feet high, therefore, without high tiering the piers must be much wider.

The cost of mechanical handling, including tiering, 15 to 20 feet high, with the interest on the investment, maintenance and amortization is less than the handling by manual labor, tiering five feet in height.

The tendency is for ships to have a continual increasing freight carrying capacity. As the draft is limited by the depth of the channels, and the length by the length of the piers, the result is to broaden the beam.

The effect is to require wider piers and sheds of greater capacity, which shed capacity can be obtained more readily and economically by high tiering than by any other way.

It is hoped that the above terminal engineering suggestions will be of service in planning quays, piers and sheds for terminals.

New York, July, 1917.

FORMAL OPENING OF CANAL

On July 4th the people of Seattle and vicinity held a great celebration over the formal opening of the Lake Washington Canal, a project that is at last completed after being the ambitious goal of far-sighted residents of this section for many years. It was in 1856 that General George B. McClellan, as an army engineer, recommended to the then Secretary of War, Jefferson Davis, that a waterway be constructed through Lake Union and connecting Lake Washington and Puget Sound. In 1890 the Government made a complete survey of the proposed canal route and twenty years later an appropriation of $2,275,000 was made to construct the locks. In November, 1911, excavation began at the expense of the City of Seattle, the County and State of Washington, and since that time 4,000,000 yards of material have been removed and 230,000 cubic yards of concrete placed in the lock structures and their approaches. The total cost of the canal, including right-of-way, excavation, locks, etc., was $5,000,000, which was borne jointly by the National and State governments, the County and City of Seattle. New bridges, sewers, water tunnels, changing street grades, etc., added greatly to the cost.

The canal is about eight miles long from Puget Sound to Lake Washington. It adds more than ninety miles to Seattle's water frontage and gives access for ocean shipping to the non-tidal fresh water harbor of Lake Union, in the heart of Seattle, and Lake Washington, twenty-five miles long and four miles wide, on the eastern boundary of the city. The canal right-of-way is 300 feet wide and the channel itself one hundred feet wide, with a depth of 36 feet of water. The locks are at the Puget Sound entrance to the canal and form the only barrier between that body of water and the lakes. The height of the water in the lakes is nine feet above the high tide level of the Sound. The concrete lock walls are 55 feet high, 50 feet thick at the base, stepping down to eight feet at the copings. The major lock chamber is 825 feet long, 80 feet wide, while the minor chamber is 150 feet long and 30 feet wide. Ocean-going craft are locked through the large chamber in twenty minutes, while small vessels are put through the smaller lock in from five to ten minutes.

The Lake Washington Canal naturally has a military as well as a commercial value. Government vessels, transports, etc., will no doubt run up into the fresh water when out of service or laid up for any long period, thus lengthening the periods which the vessels can go without dry docking. It is expected that the lakes will prove attractive also to the fishing fleets as wintering quarters. Lake Union, in the center of Seattle and accessible on easy street grades from the wholesale and warehousing districts, is expected to develop into the distribution center for heavy freights in the city and for the surrounding territory. The lowering of the waters of Lake Washington has ended the heretofore frequent floods in the Renton, Sammamish and Duwamish districts of King county. A large area formerly consisting of swmp land has been drained and this property is very favorably situated for industrial and shipbuilding sites; in fact, a good portion of it is rapidly being taken up for these purposes.

Aside from all these advantages, however, the Lake Washington Canal has placed the City of Seattle in a position to extend her water front indefinitely and the great Puget Sound seaport is now in a position to take care of whatever future demands the rapidly growing foreign and domestic commerce of the Northwest shall demand of her.

The steamer "Roosevelt" headed a great procession of yachts and motorboats and was the first ocean-going vessel to enter Lakes Union and Washington. Judge Thomas Burke introduced the speakers of the celebration from the deck of the "Roosevelt" and notable addresses were delivered by Colonel J. B. Cavanaugh, the builder of the canal, who described the waterway as the greatest single asset in the Pacific Northwest, and Captain R. E. Coontz, Commandant of the Puget Sound Navy Yard, who predicted that "On with the canal to Lake Sammamish" would soon be a popular Seattle slogan.

THE NEW OAKLAND-ALAMEDA BRIDGE

In conjunction with P. A. Haviland, county engineer of Alameda County, the Southern Pacific Company's engineers have completed the preliminary plans for the new $1,500,000 joint estuary bridge which is expected to be a monument to the cities of Oakland and Alameda, to bring a wonderful development of traffic between these cities, to relieve the present congestion and delays on the roadway of the present Webster-street bridge, and greatly improve navigation on the channel as well.

Considering the magnitude of the undertaking the preliminary negotiations were completed in record time, and the Southern Pacific Company joined with Alameda County in a preliminary agreement on April 23, 1917, for the construction of a new joint double-leaf bascule bridge. The War Department has approved the engineer's plans and the county's share of the expense will be provided by bond issue.

Work will start this winter, and it is hoped to have it finished by the fall of 1918.

By joining in the erection of a single bridge of the most modern design, Alameda County and the Southern Pacific will be able to supplant the two drawbridges now doing service at Webster and Harrison streets, and navigation will thus have only one bridge to contend with instead of two, in addition to which the old center piers will be entirely removed from the channel.

The Southern Pacific portion of the new bridge, with double tracks, will have a capacity of six times that of the present Harrison-street bridge and will take care of the railroad traffic for generations.

The highway portion will include a roadway thirty-six feet wide, with a sidewalk ten feet in width. The calculated capacity of this roadway is about 2500 vehicles per hour in each direction, which is twenty-five times the present highway traffic.

The new Oakland-Alameda bridge, work on which will shortly commence, and which will do away with the present two bridges which have interfered unduly with both rail and water traffic.

From the standpoint of safety and non-interference with traffic the new structure will be admirably designed. It will start at Fifth and Webster streets and run on an elevated plan, crossing above all the streets and railroads between that point and the estuary, and will also cross above all streets in the neighborhood of the bridge on the Alameda side.

As the new structure will be about fity feet above the water, tugs, barges and other small vessels will be able to pass without the necessity of the bridge being opened. When the bridge does open 3000 tons of concrete and steel will move majestically, apparently without effort and guided by unseen hands. When completely opened the two enormous leaves, seventy-six feet wide, will each extend about 150 feet skyward and will present a novel spectacle. They will be seen for miles around.

The foundation of the estuary bridge will be no light undertaking. The water is fifty feet deep at that point, and it will be necessary to lay the foundation bare, by some one of the cofferdam methods, in order to place the concrete foundations in a proper and substantial manner.

The Southern Pacific Company has already accomplished some remarkable bridge construction on the Pacific Coast. Its swing bridge at Sacramento, which weighs 3200 tons, and its vertical lift bridge at Portland, which weighs 2250 tons, are the heaviest bridges of their kind so far constructed, while the Company's bascule at San Pedro was the largest of that type when built. The present Harrison Street bridge was constructed in 1898, and is still in first-class condition. This bridge opens for boats as many as ten times an hour, and a train is scheduled to pass over it every four minutes.—Southern Pacific Bulletin.

Alaska's Government Railroad

THE Secretary of the Interior has issued a statement setting forth the importance of the Federal railroad now building in Alaska in its relation to the present war. It is pointed out that the railroad will develop Alaska's vast resources; will encourage the production of foodstuffs, thus lessening the demand on the States for food stocks; will furnish coal for the navy, thus obviating the necessity of the long haul of coal from the East coast and liberating tonnage for more vital purposes. The statement is as follows:

On March 12, 1914, the Alaska Railroad Act was approved by the President. This act authorized and directed the President to locate a railroad in the Territory of Alaska not to exceed in the aggregate 1,000 miles. The purposes of the road, as set forth in that act, were as follows:

1. To connect one or more of the open Pacific ocean harbors on the southern coast of Alaska with the navigable waters in the interior.
2. To connect with the coal fields so as best to aid in the development of the agricultural and mineral or other resources.
3. To provide transportation of coal for the army and navy, transportation of troops, munitions of war, the mails, and for other governmental and public uses, including the transportation of passengers and freight.

The primary purpose of the railroad system authorized in the act was to develop the mineral resources of Alaska, particularly its coal.

Parts Under Construction

The main line of the road is now under construction from Seward, on the Pacific Coast, inland for 470 miles to Fairbanks, on the Tanana River, a large and navigable tributary of the Yukon. There is now in operation 150 miles.

The road taps two large coal fields, the Matanuska and the Nenana. The coal in the Matanuska field has been tested by the navy and found to be excellent for steaming purposes. The Nenana coal was recently tested by the Bureau of Mines and found to be a fair grade of lignite. It is estimated that the supply in both of these fields is practically inexhaustible. By September of this year the branch line will be completed to the heart of the Matanuska coal field. Dredging is under way at Anchorage, the nearest tidewater port to the coal fields, in order that deep-draft ocean vessels may be loaded at the docks. When the gap, about 25 miles in length, along Turnagain Arm, between Anchorage and Seward, is completed, coal can be shipped from the latter port. It is planned to close this gap early in 1918.

Now Using Matanuska Coal

The commission in charge of the railroad work is now using coal mined from the Matanuska field in the construction of the line. Construction work is being pushed as rapidly as possible, and it is estimated that at the present rate Matanuska coal can be delivered for the needs of the navy and for general use on the Pacific Coast in the early summer of 1918.

The railroad is also being constructed southward from Fairbanks to tap the Nenana field, making the coal here available for the development of such mineral deposits as copper, antimony, and gold in this part of the country. Mining here is practically at a standstill, owing to the lack of suitable fuel. The Nenana coal will also be made available for use on the railroad locomotives and on the river steamers of the interior.

Rich Valleys Traversed

The railroad traverses several rich agricultural valleys, the development of which will add to the increase of our food supply, in that it will supply Alaska's needs and obviate the necessity of making shipments of food products from the States. Along the many streams adjacent to the railroad is found a plentiful supply of cottonwood and spruce, from which large quantities of pulp for paper making can be derived.

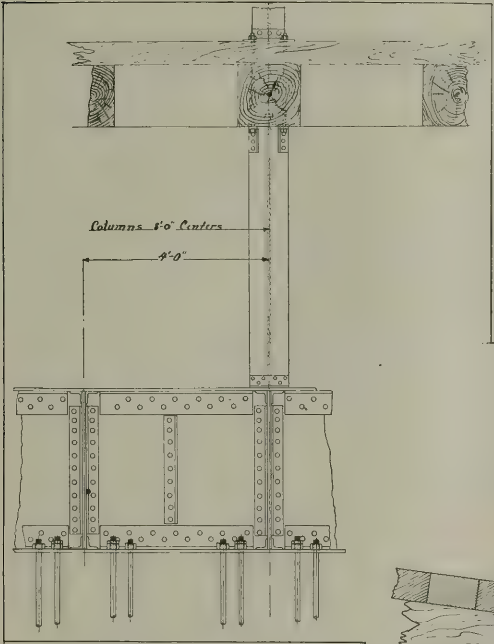
The importance of immediately completing this railroad can more readily be appreciated when it is seen that the navy could then be supplied with fuel on the Pacific Coast, without having it shipped across the continent by rail, thus releasing thousands of cars for the transportation of war materials and food; and would also release the ocean tonnage which is now required to carry from the States practically all of the coal consumed by the mining, fishing and other industries in Alaska.

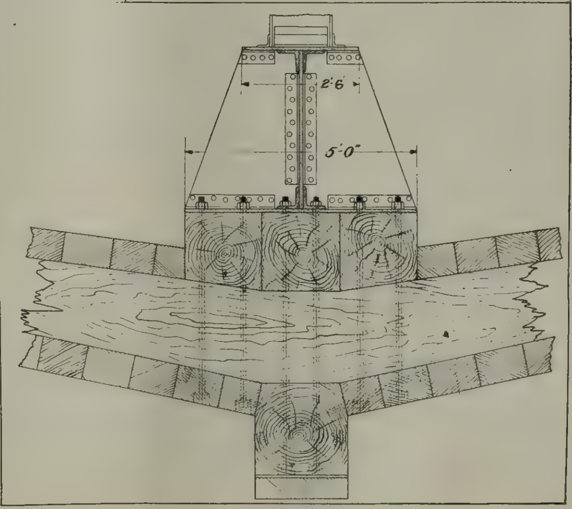
THE DONOHOE REINFORCED STEEL KEELSON

Steel has frequently been made use of in the keelson construction of wooden vessels, but it does not appear to have received serious attention from very many of the numerous builders now engaged in the construction of large wooden craft on the Atlantic, Gulf and Pacific Coasts nor has it entered into the accepted standard plan for the wooden ships for the U. S. Shipping Board.

Recently, Mr. Patrick J. Donohoe, Naval Architect and Superintendent of the Washington Overseas Shipbuilding and Construction Company, has applied for patents on a method of reinforcement with steel that he claims will revolutionize wooden hull construction and that a vessel so constructed with a length of 250 feet gains almost 3200 cubic feet in cargo space and at the same time is rendered a stronger, more seaworthy and durable ship.

"There is no question," according to Mr. Donohoe, "as to the advantages claimed, especially those of weight and space saved; and we would go further and say time saved in erection, as the steel work could be assembled from templates and shipped knocked-down to the yards, the placing in





Sketch plan of the Donohoe reinforced steel keelson for which is claimed greater strength and durability than with wooden keelsons and also a large saving in cubic hold capacity.

position, riveting and bolting down being child's play in comparison with some of the heavy forms of keelson construction in use today."

Mr. Donohoe's drawings are clear and self-explanatory and the principle involved is favorably looked upon by Lloyd's and other classification bureaus.

The Washington Overseas Shipbuilding and Construction Company has signed contracts for sixteen wooden vessels of the auxiliary type, ranging from 140 to 300 feet in over all length and contracted for by Norwegian, Brazilian and English owners. Further contracts are at the disposal of this concern if a reasonable time limit can be agreed upon. The operation of two yards is contemplated and some contracts may be sub-let to responsible firms with going establishments. The Company is incorporated under the laws of the State of Washington and is capitalized at one million dollars. Permanent officers were elected on July 20th at a meeting held in the offices of the concern in the Pacific Block, Yesler Way, Seattle,

Mr. Patrick J. Donohoe, the inventor of the new reinforced steel keelson construction, was graduated from the School of Art, Paisley, Scotland, in 1877. After practicing his profession at Paisley, Renfrew and Greenock, Scotland, he migrated to New York in 1881, following which he opened offices in New Haven, Connecticut. Later he moved to Duluth, Minnesota, and here designed a number of vessels, both of wooden and steel construction, for use on the Great Lakes. Mr. Donohoe came to the Pacific Coast in 1888 and since that time has been in close touch with all the recent developments in naval architecture.

The yard of the Washington Overseas Shipbuilding and Construction Company is located on the old Sumner Iron Works site at Everett, Washington, on the Snohomish river, and contains eighteen acres with a water frontage of 2800 feet and in addition a sectional floating dry dock four hundred feet in length. The river frontage gives ample space for eight ways. These ways are all laid broadside in pairs so that two or more boats can be put in the water the same day and keels for new vessels laid immediately thereafter. A traveling crane with boom operated by a donkey engine and crane on a flat car, travels on rails between boats for the full length of the yard and connects with the joiner shop, steam boxes, etc. The crane is fitted with a turntable enabling the placing of material at any point right or left. This makes a simple, but efficient handling system and is proving very satisfactory.

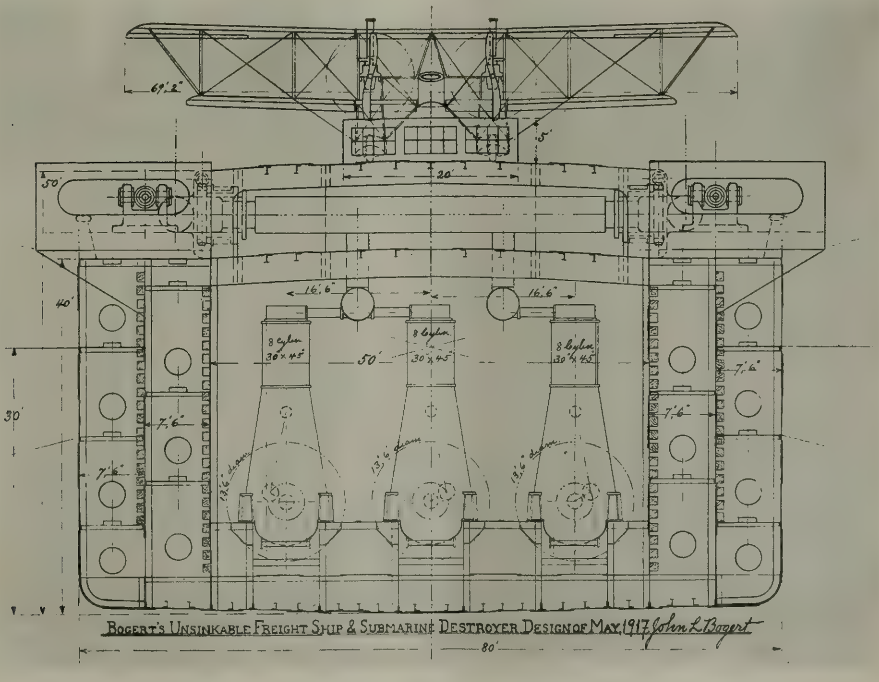
The Submarine Problem

By John L. Bogert.

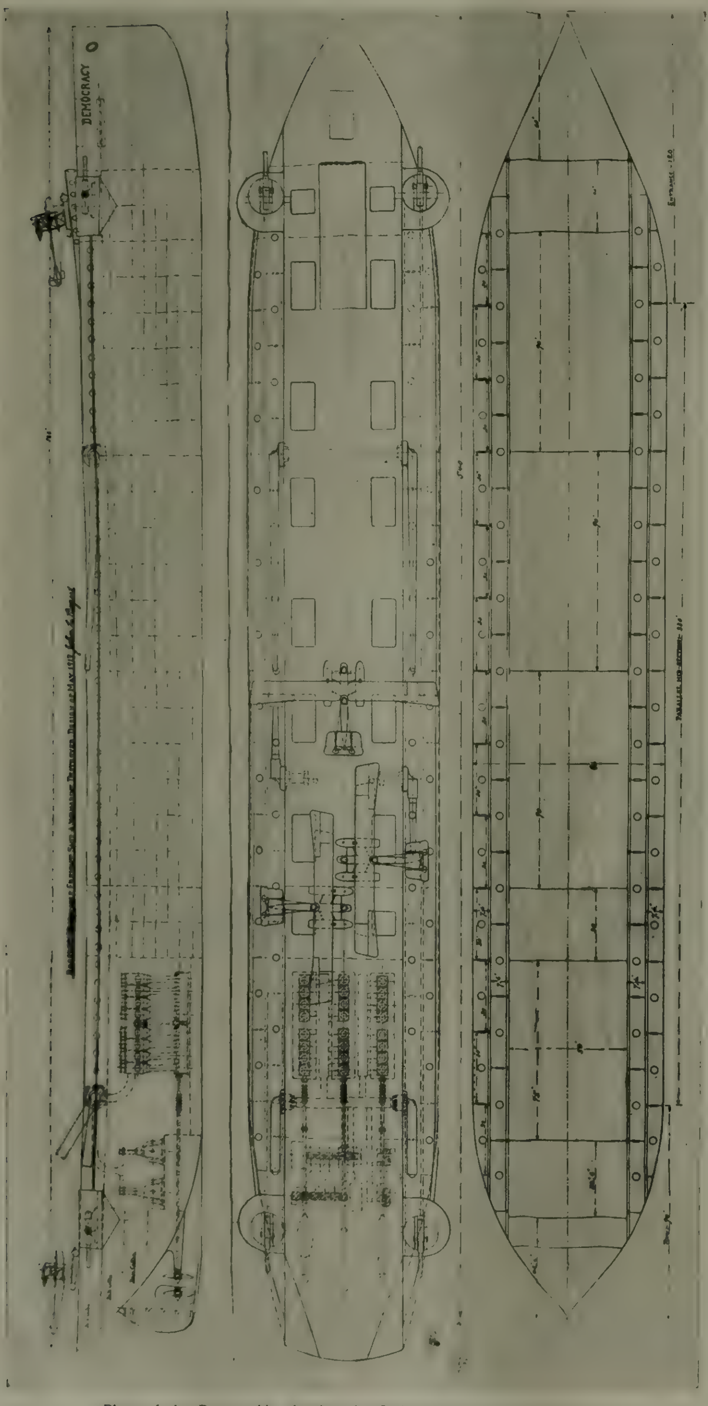
IT has remained for American brain and inventive genius to discover a thoroughly successful answer to the German boast that the U-boat would decide the war. When Lloyd George stated that what the Allies needed most was three things,—"ships, ships and still more ships"—he was revealing the utter hopelessness of the overseas transport problem viewed from the standpoint of the then existing conditions. Those who are fond of making the wish father to the thought instantly rushed into print to suggest that America, with her vast resources and her Henry Ford methods of systematized manufacture, had only to put her shoulder to the wheel and the impossible would be an accomplished fact. A thousand wooden ships should be built over night if need be—so many that the commanders of the German U-boats would get tired sending them to the bottom! Never mind how many were lost; some would get through, undoubtedly enough of them to relieve the necessities of our friends. What folly! Who ever put out a fire by feeding it with fresh combustible material? Well, any way, ships are needed, and something must be done. Certainly ships are needed, but they must be ships that no U-boat will care to attack,—ships whose defensive power is so great that many well placed torpedoes will not sink them and many well placed shots from any guns that can be worked from the unstable platform of a submarine will not disable. Also their offensive power must be such that no U-boat commander will willingly force an encounter. Well, where is there such a ship? Right here in America. How many of them are being laid down? None so far. Why not? As the immortal Goldberg would say: "Search me." It would take six months, working night and day, to turn out the first one of these ships, and after that they might be turned out every two weeks if the work has been properly systematized, the necessary facilities and resources commandeered, so that nothing has been allowed to stand in the way of this most vital enterprise, and the building and equipping of unsinkable freight ships and submarine destroyers given precedence over all other industrial activities.

Bear in mind that every one of these special vessels is capable of convoying four ordinary freight ships and giving them adequate protection. These are the days of freight trains a mile long. Four 10,000-ton dw. ships convoyed by one unsinkable freight ship and submarine destroyer, carrying 15,000 tons of cargo, the fleet making one round trip to Europe and back from this country every month, would means quite 600,000 tons of supplies so badly needed in France per year. Multiply this by ten and we get some 6,000,000 tons yearly. Think of it, every ten of these special ships a guarantee of the safe arrival annually of six million tons of wheat, coal, steel, oil,—any of the many things that must be delivered in France, and soon, too, at that, if we are to hope for anything but a drawn fight, with all the sacrifices of men and treasure for nothing!

Now that the man in the street may be able to grasp this true solution of the submarine menace problem let us go a little into the technical aspect of the matter. The submarine has a deadly enemy,—the aeroplane. For every poison there is an antidote seems to be a law of nature. The aeroplane can carry bombs capable of being set to explode either at contact with the water or so many feet under the water. The submarine under the water cannot see above the water, but the aeroplane, like some gigantic fish hawk, circling lazily up in the air, can and does see the shadow of the submarine many feet under the water, just as the bird sees the fish. The hawk swoops and dives to reappear with the fish; the aeroplane swoops to a short distance above the long dark cigar-shape shadow in the water and lets drop bomb after bomb. Lucky the U-bot that escapes. She must either go down, down so far that not the faintest indication shows up from below, or come up and fight with such anti-aircraft guns as she may be possessed of. But what chance has she if not one but several aeroplanes are circling over her, and if an unsinkable ship is but a short distance away with three six-inch rapid firing rifles trained on the spot where she must emerge? The U-boat that elects to attack has no chance; the submarine menace problem is solved. Now the questions. Why, if an aeroplane can spot and bomb a submarine, as you say, why don't they go out to sea every day on this kind of work? Answer: An aeroplane has but a limited carrying capacity, even when constructed of the largest size, with immense area of wings and great horse-power. When equipped with engines of nearly 300 horse-power the fuel consumption is some 30 gallons of gasoline per hour and the fuel tanks rarely carry much more than five hours' consumption at full power. Then, too, machine guns must be carried over the pilot's and observer's seats, for bombs alone will not answer since they can only be used directly over the object attacked. So, though the lifting power of the machine may be over 5,000 lbs., it can only fly while it has fuel, and must return for fresh supplies every few hours. If the aeroplane can fly at the rate of 80 miles per hour, and the U-boats are operating 200 miles out from the coast, all the aeroplane can do is go out, spend a few minutes looking round and then fly back; nothing doing, nothing accomplished. That is why the unsinkable "mother" ship is needed, some floating base of supplies, some sure landing stage and starting "take off." So a long vessel with a broad upper deck, free from all obstructions of any kind,—no funnels, no masts, no cranes, no ordinary deckhouses, no boats, no rafts, no wireless, no anything that might interfere with the alighting of the aeroplane or its launching. One of the original and clever features of this invention is the way in which these requirements are met. The boats, the cranes, the masts for signaling and wireless are all stowed below the upper deck, the masts and cranes being turned round horizontal thwartship axes by electric motors geared with worm and worm wheel gearing. The same is true of the smoke-stacks, funnels and exhaust pipes. All ventilators project horizontally below the upper deck. The top of the pilot-house, for this ship can carry no navigator's bridge, is inclined aft, so that it makes an ideal "take off" for the departing aeroplane. The ship is not short, shortness would not be an advantage to the alighting or departing aeroplanes. As shown in the cut, the overall length on the unobstructed upper deck is 560 feet. The upper deck is 50 feet wide, and that is the width of the inner hull, but the cellular construction of the ship's sides brings the total width out to 80 feet. It is a question whether 74



Cross-section of the Bogert mother freight ship. A well thought out solution of the submarine problem and one that is worthy of careful attention.



Plans of the Bogert ship showing the flush deck features, mounting of hydro-aeroplanes, guns, etc., and the folding funnels, signal masts, etc.

feet total width would not answer quite as well, which would mean a narrowing of the cells by 18 inches. The essential point in this unsinkable construction is that no diaphragm, partition or bulkhead, whether longitudinal or transverse, horizontal or vertical, reaches from the inner hull to the outer skin. They extend from the outer skin to the mid-skin or intermediate skin, and from the inner skin to the mid-skin or intermediate skin, but never from the outer skin to the inner skin. The reason is that a torpedo exploding against the outer skin where a partition joins it would infallibly drive the partition inward and loosen its inner joints, so that they would no longer be watertight. The cut of a transverse section of the ship shows that longitudinal wooden stringers can be employed to catch the flying fragments of outer skin. Each cell, then, may be 30 feet long, 7½ feet wide, and about 10 feet deep. These cells are served by three-foot to four-foot manholes, so that one might pass completely around the ship when in port and unloaded without coming out on the main deck. At sea, all these manholes are clamped watertight by their covers, and the flooding of one does not mean the flooding of any other, provided the force of the explosion has not sheared the rivets and started the joints. Grain or coal might be the cargo carried in these sides. There is one point that has to be rather carefully considered. It is essential that the period of rolling for this vessel shall be as long and easy as possible; not stiff, short and jerky. Otherwise the upper deck would be an unsatisfactory landing stage. Ships without bilge keels, whose beam is great in proportion to their depth, have too great righting power when inclined, and their movements in waves are uneasy. There are two solutions of this problem—bilge keels, and connected wing tanks with sufficient fluid shifting from starboard to port and from port to starboard to lengthen the period of roll. In the design and construction of these vessels all necessary precautions will be taken to keep the metacentric height within proper limits, and render the upper deck as stable a platform as possible.

The motive power shown is the Diesel engine, but that is by no means the probable source of power that will be used in this country. It is much more likely that steam in the shape of geared turbines or triple-expansion engines will be selected by the powers that be, because we have done so little with the large Diesel engine here, we have too few men skilled in their manufacture or handling. In Europe, especially in Denmark or Holland, no difficulty would be experienced in getting suitable four-cycle Diesel engines of ample power nor well-trained men to run them.

Whatever the source of power, whether oil engine or steam, the funnels, smoke-stacks or exhaust pipes must make use of "dipping" mechanism similar to that indicated in the cuts; it must be possible to lower them out of the way of the aeroplanes whenever the latter are alighting on the deck.

Likewise the probabilities are that twin screws and not triple screws will be selected, because the central screw works to a disadvantage in any full stern vessel. There is no advantage in providing for high speed, since most of the freight ships that will be convoyed will be not over 10-knot boats, and the speed of the slowest ship fixes the speed of the convoy. Could not some of the existing ships be altered to embody the peculiarities of the unsinkable freight ship and submarine destroyer? Undoubtedly. It would, however, require considerably more beam than is common, to provide for the cellular sides, though the cells might be built outside as well as inside the present hull. The decks might be changed to conform to the peculiarities of the ship of the cuts. Bear in mind it is one thing to discover a perfectly good solution to a problem that has vexed the minds of half the world, but quite another matter to get such solution turned into hard, cold fact. In every country the circumlocution office exists. In the face of a grave national crisis men will still let valuable time slip by while they haggle over non-essentials. The world's existing available freight tonnage is growing smaller. Ships are being sunk every day, and more and more U-boats are being built. All the ordinary ships we can build in a year may be sunk in a couple of months, if unconvoyed when ready for service. What folly to fancy we are at present headed for anything but destruction! Wake up, and take adequate steps to abate the submarine menace instead of supplying it with ships, ships and still more ships, that with their precious cargoes will simply litter the bottom of old ocean until crews refuse to go to probable death and destruction! If the situation were not so tragic, it would justify one in smiling at its absurdity. Building ships to be sunk!

In Gilbert and Sullivan's opera, "The Pirates of Penzance," the policemen's chorus chants: "We go, we go, we go." To which the Major General caustically replies: "But you don't go." That is the present condition here. We assert that we are getting ready to supply Europe with all she lacks, but competent observers fear that we are only going through the motions. In the foregoing article I have shown a perfectly practical solution of the problem of the submarine menace. What are we going to do about it? Waste time, O such precious time to France, with her supplies running low, while we organize and systematize and study plans, or get to work now,—today,—that eight months from today we may not be weeping over gigantic failure due to frittered away opportunity.

TACOMA

The Tacoma Shipbuilding Company has purchased fifteen acres of tidelands between the Middle Waterway and the Puyallup river. Mr. H. A. Rhodes is President of the Tacoma Shipbuilding Company, John S. Baker, Vice-President, and Judge W. H. Snell, Everet Griggs and W. R. Rust are heavily interested in the plant. The superintendent of the plant will be Mr. E. W. Heath, who is well known in wooden shipbuilding circles.

The "Sanwan," a handsome schooner-yacht built by Robert Moran on his beautiful Puget Sound estate. The building of a good-sized craft on one's front lawn is rather unique.

Shipbuilding

THE U. S. Patrol Boat "Sentinel" was launched from the Barnes and Tibbits yard in Alameda, Cal., on July 2nd. The "Sentinel" is 64 ft. long, 15 ft. 8 inches beam and 5 ft. depth of hold. She is being powered with a 125-horse power Union distillate engine.

The Skinner & Eddy Corporation launched the freighter "Jeannette Skinner" on June 30th. The "Jeannette Skinner" is 410 feet 5½ inches long by 54 feet beam by 29 feet 9 inches moulded depth. She will be fitted with a geared turbine drive and Scotch boilers. She is similar to the 8800 ton deadweight carriers which this firm has been turning out in record time and five of which were recently ordered for the U. S. Shipping Board. Mrs. James G. Eddy acted as sponsor for the "Jeannette Skinner."

The Wallace Shipyards Ltd. successfully launched the auxiliary Motorship "Janet Carruthers" from their No. 2 shipyard at North Vancouver. The vessel is 236 feet long, 45 feet beam and 20 feet 10 inches moulded depth and she will be fitted with twin 160 horsepower Bolinder engines.

The Collingwood Shipbuilding Company of Collingwood, Ontario, launched the tanker "Reginolite" for the Imperial Oil Company. The steamer is 250 feet over all, 43 feet 9 inches beam and 25 feet deep to upper deck.

The "Lucinda Hanify" building by Charles E. Fulton of San Pedro, Calif., for J. R. Hanify and Company was launched on July 10. The "Lucinda Hanify" is 235 feet long, 44 feet beam and 17 feet depth of hold and will be driven by a triple expansion engine of 1000 horsepower and cylinders 16, 27 and 46 inches in diameter by 33 inches stroke. Steam will be supplied by Ward watertube boilers. The engines for the "Lucinda Hanify" are being built by the Main Street Iron Works of San Francisco.

The Sandstrom Shipbuilding Company of Seattle has secured a contract from the Italian government for two wooden motorships 260 feet long over all, 46 feet beam and 26 feet depth of hold.

The Lyall Shipbuilding Company which has taken over the property of the Wallace Shipyard No. 2 at North Vancouver are planning extensive additions to the plant. The concern will finish the remaining two boats now on hand and will also start immediately on two of the standard wooden hulls for the Canadian Munitions Board. Eventually four more building ways will be installed, making eight in all. The Wallace interests will continue to operate their No. 1 yard where two steel steamers of the "War Dog" class are building; the moulded dimensions of these boats are 300 feet between perpendiculars, 45 feet beam and they will be driven by triple expansion engines with 24, 38 and 62 inch cylinders by 42 inches stroke. Steam will be supplied by two Scotch boilers.

The Patterson-MacDonald Shipbuilding Company has announced its intention to install a shipyard in Seattle for the construction of wooden ships.

The Fore River Shipbuilding Corporation has 67 contracts on hand including 12 merchant ships for private owners, battleships, destroyers and submarines, etc., for the government.

The Kawasaki Dockyard at Kobe, Japan, recently launched the Daifuku Maru, a 10,300-ton freighter just four months after laying her keel which shows that the Japanese yards are speeding up production in fine style. This vessel has since been disposed of to British interests and rechristened the "War Soldier."

The composite ship has appeared in the government shipbuilding program in an order from the Terry Shipbuilding Company with a yard at Port Wentworth Terminal, near Savannah, for twenty hulls of practically the same size as the standard wooden ship. These vessels will be steel framed and wood planked. The Southern yellow pine is well suited to this class of construction.

Supple & Ballin are to build eight steamers for the U. S. Shipping Board at their Portland plant. These vessels will have 700 tons more carrying capacity than the regular standard wooden ship of Ferris design. They will be 308 feet over all, 289 feet between perpendiculars, 43 feet 6 inches moulded beam and 44 feet 7½ inches over planking. They will be single screw-driven by a triple-expansion engine of 1500 horse power and steam will be supplied by Ballin Watertube boilers. The vessels will be diagonal planked and will have a steel shear strake and other reinforcement features peculiar to the Ballin patented system of construction. The first vessel is to be delivered in eight months and the whole eight inside of eighteen months.

Work on the Pacific Marine Iron Works is well under way foundation piles now being driven. This new Portland plant is already assured of contracts aggregating close to $1,500,000.

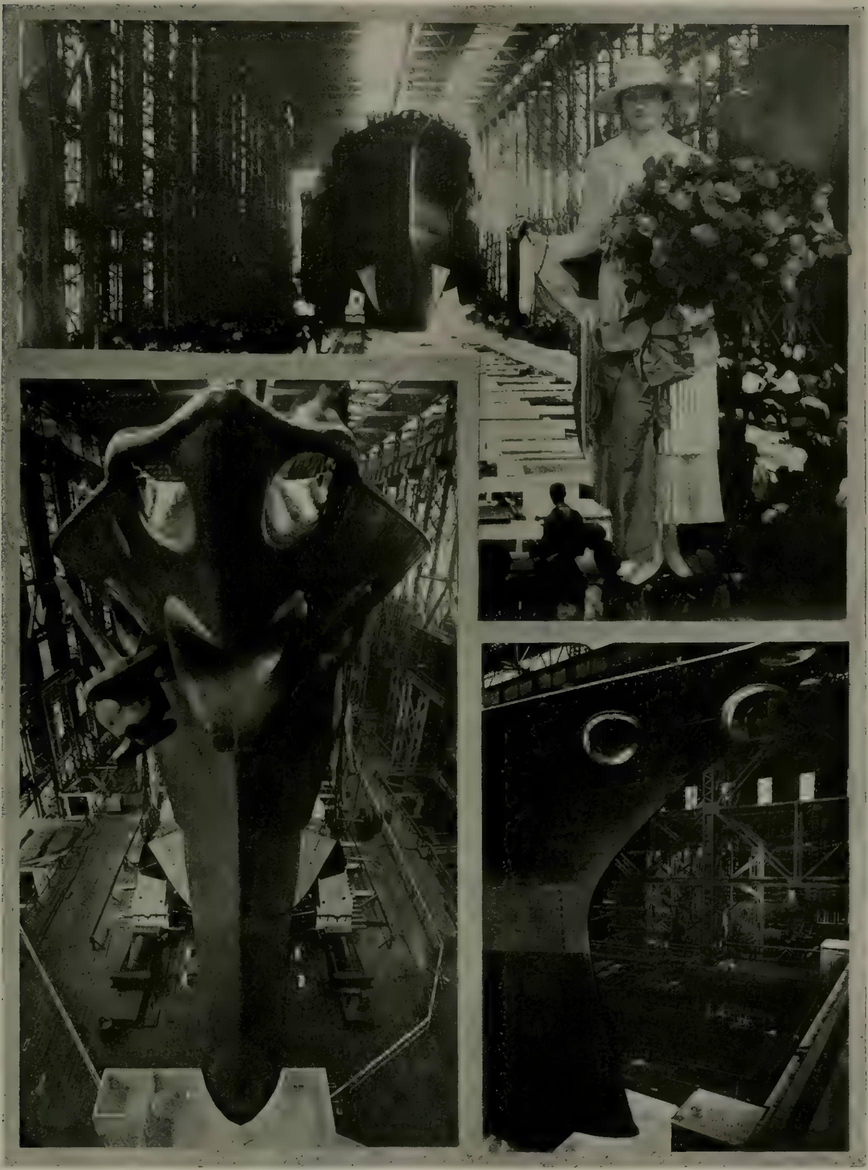
One of the latest tankers to leave the ways at the New York Shipbuilding Corporation's plant at Camden, N. J., was the "Gulf of Mexico" built to the order of the Gulf Refining Company. The "Gulf of Mexico" is 485 feet over all, 468 feet 6 inches between perpendiculars, 62 feet 3 inches beam and 39 feet 6 inches depth. She is built to the highest rating at Lloyd's and has a deadweight capacity of 12,350 tons.

On June 30th, the Moore & Scott Iron Works of Oakland, Cal., launched the steamer "Sagaland." The "Sagaland" is 376 feet long by 52 feet 3 inches beam by 28 feet deep and is driven by a 2400 horse-power General Electric geared turbine, steam being supplied by three B. & W. boilers.

LAUNCH OF THE "IDAHO"

Contrary to the usual custom in times of peace, the latest United States battleship to leave the builders' ways was launched in the presence of comparatively few spectators although all the usual ceremonies were observed. This latest addition to the nation's first line of defense is the superdreadnaught "Idaho" building at the plant of the New York Shipbuilding Corporation, Camden, N. J.

The vessel was launched on June 30th and was christened by Miss Henrietta Simons, granddaughter of Governor Alexander of the State of Idaho.



Launch of the U. S. Battleship "Idaho" at the New York Shipbuilding Corporation's plant at Camden, N. J. The sponsor was Miss Henrietta Simons, granddaughter of Governor Alexander of Idaho. The peculiar bow construction of the battleship is well shown.

The principal dimensions of the superdreadnaught are as follows: Length, 624 feet; breadth extreme to outside of framing 97 feet 4½ inches; displacement 32,000 tons and mean draft 30 feet. Her armament consists of twelve 14 inch guns, twenty-two 5-inch rapid-fire guns, four 3-pounders, four anti-aircraft guns and two torpedo tubes. The "Idaho" will be manned by 56 officers and 1,141 men.

The "Idaho" is a sister ship of the "Mississippi" recently launched at the yards of the Newport News Shipbuilding and Dry Dock Company and the "New Mexico" recently launched at the New York Navy Yard, Brooklyn. Her keel was laid on January 19, 1915, and when launched she was about 70 per cent completed. It is expected that the vessel will be completed within the thirty-six months specified at the time the keel was laid.

The pictures herewith illustrate very clearly the peculiar type of bow now being built in our dreadnaughts. It is apparent that with this overhanging bow that anchor chains and mooring cables will have little chance of fouling.

Panorama of the National Shipbuilding Company's plant at Seattle.

SEATTLE YARD FORGING AHEAD

The plant of the National Shipbuilding Company, a panorama of which is shown herewith, is situated in the heart of Seattle's industrial district but in close proximity to attractive residential sections.

The yard is practically complete and is equipped with a modern wood working machinery of the latest designs. At the present time there are three vessels under construction at this plant. One of these is a 1000 ton steam schooner for L. H. Wakefield & Company of Seattle and the others are 280 foot auxiliary powered schooners for Eastern and Norwegian interests. It is expected that the two auxiliary powered vessels will be launched in December of this year.

The plant is so arranged that no heavy timber entering the yard has to be handled by hand during any of the stages of its progress into the structure of the ship. Gantry cranes are to be arranged for operating between each pair of ships and these gantries will travel the full length of the ways. The mill and material yard are so arranged that the progress of work is all in one direction, there being no corners to turn or lost motion in the movement of material.

Many unique adaptations of machinery have been made with the purpose of expediting work among which are a swinging cut-off saw for cutting bits off the flitches; travelling cranes for cardying timbers to and from the saws, portable moulding saws, etc.

The buildings at present on the property include saw mill, mould loft, compressor house, blacksmith's shop, shear shop, paint shop, Oakum storehouse, general storehouse, joiner shop-rigging loft, hospital and office.

Spur tracks have been installed which will be connected with the East Marginal Way Railroad which is to be built by the Southern Pacific system.

SHIPBUILDING NOTES

The Northwest Steel Company has received an order for four 8,300 ton deadweight capacity freighters from the French Government. The Columbia River Shipbuilding Corporation of Portland, and J. F. Duthie & Company of Seattle have also received contracts for two 8,300 tonners each from the French Government. These contracts followed the visit to the Northwest of Mr. Roland Pervue, a naval architect and representative of the French Government. Mr. J. R. Bowles, President of the Northwest Steel Company, arranged the necessary formalities over these foreign orders with the U. S. Shipping Board.

The launching of their fourth large schooner took place at the Seaborn Shipyard, Tacoma, on July 20. The vessel, which is building to the order of Ostrander & Morrison and has been already chartered for a voyage to African ports with lumber. She is 260 feet long, 44 feet beam and 21 feet moulded depth.

The Olympia Shipbuilding Company of Olympia, Washington, launched the big powered schooner "Wergeland" on July 21st. This vessel is contract No. 4, at the yard and is a five-masted topmast schooner, 290 feet long, 48 feet beam and 27 feet deep. She will be equipped with twin 350 horse power internal combustion engines and is alreeady under charter to carry 2,500,000 feet of lumber to Australia. Mrs. Eugene Ward, wife of the President of the shipbuilding company, christened the "Wergeland."

A startling example of the profits made by some of the smaller shipowning concerns is presented by the case of the Chuyetsu Steamship Company, a Japanese concern. This company had one of its vessels sunk recently by a German submarine and decided to sell its fleet and retire from the steamship business. At the liquidation the holders of the original stock who purchased shares at $2.50 received $500 per share.

The Coos Bay Shipbuilding Company of which Mr. A. E. Adelsperger is President, is to build four Hough type ships for the U. S. Shipping Board. The yard of this concern adjoins the C. A. Smith Mills at Marshfield, Oregon.

The Warrenton Engineering and Construction Company with a shipyard at Warrenton, near Astoria, Oregon, and now doing preliminary work on a shipyard site in South Portland, Oregon, is understood to hold contracts for eight wooden steamers, presumably from the Shipping Board or the French Government.

The Foundation Company, for whom Mr. C. F. Swigert is Portland Manager, have begun pile driving for building berths on their North Portland site. Ten building ways will be installed upon which twenty wooden steamers for the French Government will be constructed.

The Pacific Lifeboat Company, recently organied, has leased a waterfront sits at Portland. The firm has orders for forty wooden and steel life boats on hand.

Kruse & Banks of North Bend, Oregon, launched the double-ended type steam schooner "Virginia Olson" built to the order of the Oliver P. Olson Company of San Francisco on July 14. The steamer is 235 by 43 by 17 feet moulded.

On July 9th at Trenton, Nova Scotia, was launched the steel freighter "War Wasp" from the yards of the Nova Scotia Steel and Coal Company. This marks the initial entry of the province into the steel shipbuilding industry.

Mr. John S. Irby was nominated on July 13th as Surveyor of the Port of San Francisco by President Wilson.

During the past month a new lumber mill has been projected in Tacoma, which is to cater entirely to shipbuilding requirements. The incorporators are P. J. Stone, William Leybold, John B. Kellogg and John E. Simpson. A site has been purchased on the Hylebos waterway, where the mill will be erected. The plant will be equipped to cut timbers 120 feet long and surface sticks 32 inches square. The capacity will be about 50,000 feet per day.

The Motorship Construction Co. and the Oregon Shipbuilding Company have consolidated and will carry on the construction of small craft on a large scale. Mr. Merrill T. Reed, President of the Motorship Construction Company, remains as President of the merged concerns, while W. M. Umbdenstock, formerly President of the Oregon Shipbuilding Company, is Secretary. Mr. J. W. Dougherty is Treasurer of the new company, which now has contracts for eighty-two lifeboats. The plant at which this work is being done is located at Vancouver, Washington.

The Griswold-O'Donnell Company has leased 1,200 feet of waterfront property at Vancouver, Washington, for shipbuilding purposes. Mr. E. A. Griswold, President of the corporation, was formerly with the West Oregon Lumber Company and the Falls City Lumber Company. Mr. M. J. O'Donnell, Vice-President, was formerly with the Stone, Webster Company and is a construction engineer. Mr. Clarence Eubanks of Portland is Secretary of the new concern, which expects to close with the government for some wooden ships.

The accompanying illustration shows the recently completed fisheries inspection boat "Auklet," which, with her sister vessel, the "Murre," were constructed by the Elliott Bay Yacht and Engine Company of Seattle from the designs of Martin C. Erismann. The "Auklet" and "Murre" are 48 feet in length, 12 feet 6 inches beam and draw 5 feet 6 inches. The living quarters and accommodations are very well planned out, the comfort of the officers and crews during long inspection tours being always uppermost in the designer's mind. The vessels are driven by 25-horse-power Standard gas engines.

The Fisheries Patrol boat "Auklet," one of two handsome craft built by the Eliott Bay Yacht & Engine Company and designed by Martin C. Erismann.

THE S. S. VIRGINIA

The S. S. Virginia, the last of an order for a fleet of four large tankers constructed by the Fore River Shipbuilding Corporation for the Texas Oil Company of New York was successfully launched on June 26th at the Fore River yards.

The time honored ceremony of "christening" the new vessel was conducted with unusual simplicity. Indeed, so busy are the officials of the Texas Oil Company these days that none of them could find the time to come from New York to grace the occasion with their presence and they paid Mrs. Joseph W. Powell, wife of the President of the Fore River Corporation, the compliment of asking her to discharge the duties of sponsor on their behalf.

There were but few guests present to watch the big ship take the water. Mrs. Powell cracked a bottle of champagne bedecked with colors of red, white and blue on the bow of the vessel with the skill of an expert, for she has on several occasions acted in a similar capacity. Obedient to her bidding, the Virginia slipped gently into the water to the tooting of the big siren. The pieces of the broken bottle, in accordance with custom, were preserved and presented to Mrs. Powell in a handsome teak-wood box, while she was also presented with a more serviceable memento of the occasion in the form of a diamond pin.

The Virginia will be rushed to completion and in a few weeks will be placed in commission.

The S. S. Virginia is one of a fleet of four oil tank steamers constructed by the Fore River Shipbuilding Corporation for the Texas Steamship Company of New York. Two of the fleet, the "Texas" and the "New York" were completed last year, and are now in service. The "Pennsylvania" was launched two weeks ago.

The "Virginia" has two continuous steel decks, a raised forecastle, open bridge, and poop decks, with a lower deck in the package freight hold forward. The hold is divided by oil-tight bulkheads into sixteen main oil cargo tanks, sixteen summer tanks, fuel oil tanks, two pump rooms and a cargo hold, machinery space aft, deep trimming tanks both forward and aft and a double bottom under the engine and boiler.

The length over all is 432 ft., the vessel having a dead-weight carrying capacity of 9100 tons. The capacity of the main cargo oil tanks is 67,930 barrels and of the summer tanks 8634 barrels. Her fuel oil capacity is 10,450 barrels.

The "Virginia" has been designed to carry various grades or refined oil without danger of mixture. The cargo pumping system has, therefore, been worked out to an unusually high point of efficiency necessitating the use of twelve pumps—eight for the cargo in the main tanks and four for handling the oil in the summer tanks.

The tanker "Pennsylvania" at the fitting-out dock of the Fore River Shipbuilding Corporation, Quincy, Mass.

The vessel is propelled by a single screw driven by a three cylinder, triple expansion engine, steam being supplied by three single ended Scotch boilers. These boilers are oil fired on the White atomizing oil burning system.

The accommodations of the officers and crew are unusually complete.

THE "PENNSYLVANIA"

As an indication of the demand for carriers of all descriptions and the pressure at which the Fore River Shipbuilding Corporation is now working to turn out the vessels it has under construction at the present time, the "Pennsylvania," a tanker nearly 450 feet long and with a deadweight capacity of 9,100 tons, which was launched on June 9th, was commissioned and delivered to her owners, the Texas Oil Company, on July 1.

The "Pennsylvania" left her slip at Fore River on July 1st and the builders' trials were conducted while she was en route to New York.

The Fore River Shipbuilding Corporation is steadily increasing its momentum. The number of men employed, working in night and day shifts, is gradually nearing the 7,000 mark, and every facility is provided them making for the best of working conditions. President Joseph W. Powell states that in a few weeks he expects to have about 11,000 men, skilled and unskilled, engaged in the yard.

ANOTHER LOS ANGELES YARD

The latest shipbuilding concern to be formed in California is the Lilly-Fletcher Shipbuilding Company of Los Angeles. This concern has secured a site from the City of Los Angeles at Wilmington Harbor. The site covers over six acres and the company is to put in five building slips and equip the plant with modern machinery and buildings. At least four of the Government standard wooden ships will be bid upon and as the yard is well financed actual construction work will soon be under way. Those interested in the plant are J. B. Lilly and Paul B. Fletcher of the Lilly-Fletcher Company, Los Angeles contractors, and Mr. Henry A. Coit who originated the plan tnd brought it to a successful conclusion. Mr. Martin C. Erismann, heretofore a well-known Seattle naval architect, will be the naval architect and engineer in full charge of the new plant and is planning all the buildings and settling upon the equipment.

REINFORCED CONCRETE SHIPS

(Communicated)

The problem that confronts our country of increasing the merchant marine requires the consideration of every possible method or material of construction. Several prominent engineers have suggested reinforced concrete.

A San Francisco paper mentioned in a recent issue the interesting fact that a local firm of engineers was designing a ship with a length of 330 feet, a beam of 44 feet and a depth of 31 feet, with a capacity of 4500 tons—to be built of reinforced concrete. This is not something new—a concrete schooner was employed for some years in the north Atlantic coasting trade, having been constructed in about 1898. The London Times mentions a small boat of reinforced concrete built by a Frenchman in 1849 and still in service after a test of 68 years.

The concrete ship is only a further development of the concrete barge and such craft have been in successful use for years. Concrete lighters have been used for the past six years on Chesapeake Bay, supplying coal and water to dredges, carrying loads of sand and gravel, etc., and the accompanying illustration of a 500-ton lighter on the ways just before launching is typical of their appearance. With such a craft there is no necessity for caulking or painting, the upkeep is small and there is no danger of decay. Barnacles will not collect on a concrete hull.

A concrete barge has been in service on the Walland Canal since 1910 and has seen very hard usage. It has a length of 80 feet, a beam of 24 feet and is 7 feet deep. It is interesting that the walls which were constructed between forms are 2½ inches thick, reinforced with steel rods, yet the barge is used for carrying loads of stone, etc., with conspicuous success.

Since 1910 reinforced concrete barges have been built for use on the various sections of the Panama Canal and their experience has enabled the engineers to develop a very efficient type of vessel. Recently concrete pontoons were constructed for service as landing stages for boats up to 65 feet in length. These pontoons have a length of 120 feet, a beam of 28 feet and are 8 feet deep. They are very thoroughly reinforced.

Vessels which are more like ships than barges have been built of reinforced concrete in Norway. A report from the American Consul General at

A large reinforced-concrete barge built for service on the Welland canal which has shown excellent results in service.

Christiania describes a plant at Moss, Norway, where vessels of 3000 tons displacement are being constructed. The following quotations from the report indicate the extent of the work under way at that time:

"The inventor of this new style of vessel is said to be M. Nicolai Fougner, an engineer, who claims to be able to construct a ship of any size demanded. He is now building a lighter for a mining company at Sydvaranger for the oversea export of iron ore and the import of coal. The vessel, having a displacement of 3000 tons, is to be ready before the end of the current year. It is stated that these concrete ships can be sailed or engined like other vessels, and experts consider that a new epoch in shipbuilding has arrived.

"The ship, which arrived in Christiania last month, resembles a large barge, and is constructed entirely of concrete with the exception of the ribs, which are of steel. This new method of constructing ships has attracted much attention. The Swedish Minister of Marine, M. Brostrom, one of Sweden's largest shipowners, immediately ordered a lighter of some one thousand tons displacement, and he was present when the craft was launched at Moss. He was accompanied by four experts, all of whom expressed much satisfaction at the result.

"Two other lighters are now on the stocks, and a large slip for a 4000-ton craft is nearly completed. More than 200 men are now working in the new yards, and five lighters have been contracted for in addition to the one completed and the two on the slips."

In view of such examples proving the usefulness of concrete vessels of this character, it would seem wise to consider concrete in the construction of ships which are to increase our merchant marine to the proportions demanded by the present requirements. If sea-going barges were to be constructed, or smaller craft suitable for lake traffic, this would release for other purposes many ships now in use in this capacity. The presence of the necessary materials for a concrete vessel at so many convenient locations would make it possible to provide a large tonnage, and progress in construction would be faster than with ships of steel or wood.

The subject is certainly one worthy of serious consideration on the part of the Shipping Board in connection with their present program of ship construction.

Shipbuilding in the South

SCORES of shipbuilding plants are springing up along the Gulf and Atlantic Coasts, and soon hundreds of wooden vessels, both for the government and private use, will be under construction.

The United States Emergency Fleet Corporation has just placed contracts with the Universal Shipbuilding Company of Houston, Texas, for twelve wooden ships; with the Traylor Shipbuilding Corporation of Cornwallis, Pa., for ten, and with the Portland Ship Ceiling Company at Portland, Me., four.

Weaver & Son, shipbuilders at Orange, Texas, have closed a contract for the construction of a three-masted schooner for Ira C. Harrington. The vessel will be placed in commercial service.

A shipbuilding plant has been begun by the Pan-American Trading Company along Buffalo Bayou, near Houston, Texas. The company recently purchased a tract of 5,350 acres of land. Contracts were let for 1,000 piling to be cut from timber on the company's holdings.

At Beaumont, Texas, the Beaumont Shipbuilding & Dry Dock Company expects to start laying the keels for eight wooden vessels of 1,000 to 3,000 tons within the next three weeks.

The keel for the first of seven ocean-going vessels to be built by the National Shipbuilding Company of Texas, at Orange, has been laid. The derricks are all completed and most of the machinery installed in the new plant.

Ten acres of land on the waterfront at Palatka, Fla., have been purchased by Max Germain and Nicholas Dillion, both of New York City, on which they will build a plant for the construction of wooden vessels. The gentlemen interested expect to operate a plant that will give employment to 400 men.

The Florida Shipbuilding Company has incorporated under the laws of the state, its officers being as follows: R. J. Clifford, President; J. M. Schlonbach, Secretary, and J. K. Williams, Jr., Treasurer. The stockholders are the owners of sawmills in Georgia and Florida. The site secured for the plant has a water frontage of 250 feet.

Charles N. Crowell, in charge of wooden vessels construction in the southwestern territory for the government, recently visited Orange, Texas, and held a conference with local builders. He was well pleased with the manner in which shipbuilding plants at that point are doing the work so far assigned them.

A wooden ship was launched last week by the Hillyer-Sperrin-Dunn Co. at Jacksonville, Florida. This vessel was built for the Berg Distilling Company of Philadelphia, and is the largest wooden vessel ever built in Florida.

It is announced by Captain J. F. Cushman and associates of Philadelphia that they intend to build a plant at Jacksonville, Fla., for the construction of ocean-going vessels. They say they expect to have it in operation in a few weeks.

A contract has been closed by F. F. Bingham, shipbuilder at Pensacola, Fla., for the building of a 350-ton power schooner, the vessel to be built for a lumber shipping concern in that territory.

Contracts for the building of four mine sweepers and two 3,500-ton full-rigged ships by a Philadelphia concern have been offered to and accepted by the Alabama Dry Dock and Shipbuilding Company, Mobile, Ala. One 500-ton schooner is now nearing completion on the ways of this company.

Rapid progress is being made on the four submarine chasers being built by the Barret Shipbuilding Company, and should soon be ready for final inspection on the ways.

The Murnan Shipbuilding Company, also of Mobile, has completed a 1,000-ton marine way, and a runway for a locomotive traveling crane is now being constructed.

At Gulfport, Miss., there has been organized and incorporated with a capital stock of $200,000 the City of Gulfport Shipbuilding Company. The incorporators are Henry Piaggio, one of the leading shipbuilders and exporters of lumber in the South; B. E. Eaton, and D. R. McInnis, the latter manager of Mr. Piaggio's interests at Orange, Texas. Mr. Eaton is general counsel for the Gulf and Ship Island Railway.

The L. N. Dantzler Lumber Company has begun constructing a shipyard, to build ships for its own use, at Moss Point, Miss., at a point on the East Pascagoula River, and about half a mile south of the Esctawpa River, the site being known as Griffin's Point. They will put up an up-to-date shipyard and will within the next 20 or 30 days lay the keels for three vessels of 1,250 or 1,500 tons each, employing from 200 to 300 men in the work.

The Valk & Murdock Company, at Charleston, S. C., has completed plans and started work on the building of a plant intended to construct all steel vessels for the account of the Emergency Fleet Corporation. Wooden vessels will also be constructed.

It has been announced by the officials of the United States Maritime Construction Company that construction of the two-million-dollar plant at Brunswick, Ga., would be started this week. It is intended to hurry along the work, as contracts for a number of ships have been secured.

Contract has also been awarded the Maryland Shipbuilding Company, Baltimore, Md., for six wooden vessels, involving a total of about $3,000,000.

Other points in the South at which shipbuilding is in progress or contemplated include: Lake Charles, La.; Morgan City, La.; Slidell, La., and Madisonville, La.

A Splendid Record

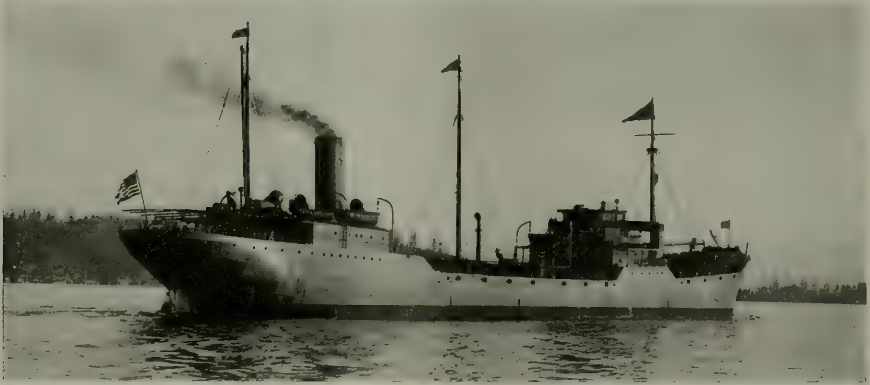
ACCOMPANYING this article is a picture showing the site of the Skinner & Eddy Corporation plant on February 14, 1916, the same site on June 6, 1917, and the first six ships completed at the plant. This gives us a graphical story of one of the most splendid shipbuilding achievements of the last few months, a period which has no parallel in the former history of the shipbuilding industry in the United States. In addition to the six vessels shown as being constructed, a seventh steamer, the "Jeannette Skinner," of 8800 tons dw. capacity, was launched on June 30, 1917, and the "Frances L. Skinner," formerly the "Sesostris," was completely overhauled.

When it is considered that the first sixteen months of the existence of the Skinner & Eddy Shipbuilding Corporation produced not only 63,200 tons dw. of shipping, but also built up a plant and an efficient personnel to manage it, the record made by this northern yard is surely a splendid one. The elapsed time in building the first seven ships may be tabulated as follows, the vessels being given in the order of their production:

Name	launching, days Keel laying to	Launching to delivery	Dw., tons	Type
"Niels Nielsen"	139 Cal.	49 Cal.	8800	freighter
"Hanna Nielsen"	160 Cal.	61 Cal.	8800	freighter
"Luise Nielsen"	120 Cal.	47 Cal.	8800	freighter
"S. V. Harkness"	217 Cal.	46 Cal.	9600	tanker
"Josiah Macy"	168 Cal.	48 Cal.	9600	tanker
"Stolt Nielsen"	112 Cal.	34 Cal.	8800	freighter
"Jeannette Skinner"	78 Work.	......	8800	freighter

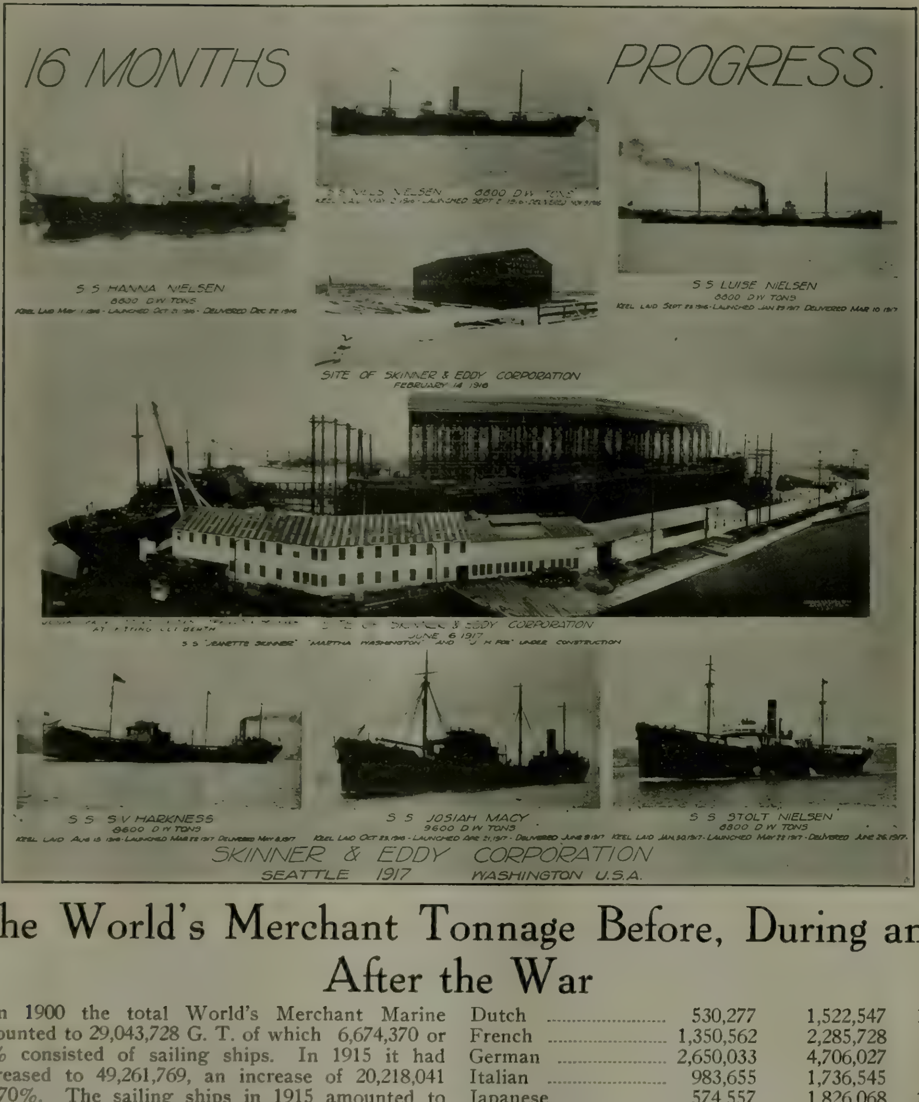
As will be noted from the general view of the plant, the Skinner & Eddy yard is a compact one. Additional waterfront property has been purchased, however, and will be converted to yard purposes. The trolley and hoist system of handling materials has been brought to a high state of perfection, and the building record made on the "Jeannette Skinner" is ample proof that shipbuilding of the most rapid character is possible with this type of equipment.

Launch of the "Stolt Nielsen" at the Skinner & Eddy Corporation, Seattle. The vessel is shown sliding out between two vessels at their fitting-out berths.



The "S. V. Harkness" on trial. This splendid tanker is a part of the large output for which the Skinner and Eddy Corporation is already credited.

The "Josiah Macy," the second big Skinner & Eddy tanker, on her trial trip.


16 MONTHS PROGRESS.
S S HANNA NIELSEN
8600 D W TONS
KEEL LAID MAY 1 1916 - LAUNCHED OCT 31 1916 - DELIVERED DEC 22 1916
NELS NIELSEN 8800 D W TONS
KEEL LAID MAY 2 1916 - LAUNCHED SEPT 2 1916 - DELIVERED NOV 9 1916
S S LUISE NIELSEN
8800 D W TONS
KEEL LAID SEPT 23 1916 - LAUNCHED JAN 29 1917 DELIVERED MAR 10 1917
SITE OF SKINNER & EDDY CORPORATION
FEBRUARY 14 1916
AT FITTING OUT BERTH
SKINNER & EDDY CORPORATION
JUNE 6 1917
S S "JEANETTE SKINNER" "MARTHA WASHINGTON" AND "J H FOX" UNDER CONSTRUCTION
S S S V HARKNESS
8600 D W TONS
KEEL LAID AUG 15 1916 - LAUNCHED MAR 22 1917 DELIVERED MAY 8 1917
S S JOSIAH MACY
9600 D W TONS
KEEL LAID OCT 23 1916 - LAUNCHED APR 21 1917 - DELIVERED JUNE 8 1917
S S STOLT NIELSEN
8800 D W TONS
KEEL LAID JAN 30 1917 - LAUNCHED MAY 22 1917 - DELIVERED JUNE 26 1917.
SKINNER & EDDY CORPORATION
SEATTLE 1917 WASHINGTON U.S.A.

The World's Merchant Tonnage Before, During and After the War

In 1900 the total World's Merchant Marine amounted to 29,043,728 G. T. of which 6,674,370 or 23% consisted of sailing ships. In 1915 it had increased to 49,261,769, an increase of 20,218,041 or 70%. The sailing ships in 1915 amounted to 3,532,561 or only 7% and showed a decrease since 1900 of 3,141,809 or 47%.

In 1900, 4,009,622 tons or 13% were wooden vessels—7,398,102 or 26% were iron and 17,508,704 or 61% were steel. In 1915 the wooden vessels represented 4%, the iron 7% and the steel 89%, indicating the rapid development of the steel construction and the rapid disappearance of the "wind jammer."

The following table showing the total tonnage of the leading Maritime Nations in 1900 and 1915 indicates distinctly those who were the most active in building up a foreign commerce:

	1900	1915	Inc %
British	14,261,254	21,274,068	49
United States	2,750,271	5,892,639	114
Austrian	416,084	1,018,210	145
Danish	519,011	854,996	65
Dutch	530,277	1,522,547	187
French	1,350,562	2,285,728	69
German	2,650,033	4,706,027	78
Italian	983,655	1,736,545	77
Japanese	574,557	1,826,068	218
Norwegian	1,640,812	2,529,188	54
Swedish	637,272	1,122,833	76

In 1916 British, Austria, Dutch, French, German and Swedish show a decrease under 1915 reflecting the effect of the ruthless submarine policy of Germany while the United States, Denmark, Italy, Japan, Norway show an increase. It must be remembered, however, that German interned ships have been seized amounting to over one million tons—the United States alone having taken 636,036 tons and Portugal quite a number. While these will probably be paid for at the end of the war it is unlikely the actual ships will be returned so that Germany and Austria together will have lost about one-fifth of the vessels they owned prior to the war and the nations absorbing them will show a corresponding increase.

There are no authentic records of either the loss due to the war or the actual records of present construction. The New York Journal of Commerce for March 2nd places the total loss since the opening of hostilities to February 28th, 1917, at 4,811,100 gross tons. The British Admiralty report losses of ships over 1600 tons from March 1st to April 25th of 155 vessels. Allowing 3000 tons to each vessel it is the opinion the best approximation may be reached. This would give 465,000 tons March 1st to April 25th but this is undoubtedly much too low and 1,000,000 tons would be much nearer the correct figure as the Germans claim to have destroyed about 1,600,000 tons for the first two months of unrestricted warfare (February and March 1917) and assert the losses during April were much heavier.

Taking these figures, then, as being as nearly correct as obtainable it gives a total of 5,811,000 tons destroyed from the beginning of the war to April 30th. The total gross tonnage on June 30th, 1914, was 49,089,552 and June 30th, 1916, it was 48,683,136, which shows a net loss of 406,416, not taking into account the average normal increase which is about 5%.

Taking 1915 total, therefore (as but small loss occurred in 1914) and adding 5% it gives 51,724,857 and adding 5% to this it makes a total for 1916 of 54,311,099 and which might reasonably have been expected as the total 1916 tonnage had the war not broken out. Deducting the 1916 figures given by Lloyds—viz. 48,683,136—from this it leaves 5,627,963 difference, which represents the loss and practically confirms the estimated loss of 5,811,000. In normal times new tonnage runs very close to 3,000,000 tons a year or somewhere around 200,000 tons more than the average loss by war but the increase has been considerably reduced owing to the greater activity in naval construction. Should the present ratio of construction and destruction continue for another year—say till June 30th, 1918, we might figure a reduction in the world's total tonnage of about two percent making it approximately 47,709,474 or slightly more than it was when the war broke out. However, it must be remembered many vessels have been commandeered by the belligerents which are receiving very hard usage and lack of renewal and proper maintenance, consequently much of this tonnage will be practically worthless or laid up for repairs for long periods. On the other hand owing to the unprecedent prices being offered for charter and sale there has been a very large increase in the building capacity and this increase—constantly growing—will soon overcome the war losses providing they become no greater.

Therefore from all indications should the war last until next year peace should see the merchant marine of the world greater than it was before the war, although possibly not quite as great as had no war occurred. It must be borne in mind, however, that the demand for tonnage will apparently be much greater after the war—the countries of Europe must be re-constructed and all the warring nations will undoubtedly make supreme efforts to manfuacture and market their goods which means the importation of vast quantities of raw materials and export of finished products, all of which will require a much greater tonnage than ever before.

It would appear, therefore, reasonable to assume that the nation with the most merchant vessels will be the one having the greatest advantage and from the table of increased building at the opening of this article it would appear the United States, Holland, Japan and Norway are well in line for this desired position.

C. A. COOLIDGE

One of the men who have been prominently identified with the recent large developments of wooden shipbuilding on the Pacific Coast is Mr. C. A. Coolidge who has had charge of the construction and development work at the McEachern Ship Company plant, Astoria, Oregon.

Mr. Coolidge graduated from the Civil Engineering college of the University of California in 1889 and after following railroad construction work for several years, served as First Lieutenant and Adjutant of the Second Volunteer Regiment of Engineers during the Spanish-American war.

Mr. Coolidge had always been interested in the sea, however, and made a serious study of naval architecture following his college career. This desire led him to put in some time working in a steel shipbuilding establishment and he afterwards served for three years at sea in the engine room.

In 1907, Mr. Coolidge accepted the general managership of the Hill Electric Line System in the Willamette Valley, but once more in 1913 his interest in maritime affairs led hi mback to salt water and he joined the Portland office of W. R. Grace & Company. When this firm withdrew their Portland-East Coast service, Coolidge affiliated himself with the Andersen interests and was put in direct charge of the McEachern Shipbuilding plant at Astoria.

Mr. C. A. Coolidge, a well known shipyard manager.

British Marine Notes

(Exclusive Correspondence of "Pacific Marine Review.")

London, June 20th, 1917.

NOT for the first time Sir Owen Philipps, the chairman of the Royal Mail Steam Packet Company, has entered the lists in defense of the great ocean carriers against the charge that they are largely responsible for the enhanced cost of living in this country. It cannot, of course, be denied that high freights, the inevitable result doubtless of the immense demand for a diminishing amount of tonnage, have played their part in increasing the price of food, but this fact makes it necessary to emphasize that the Royal Mail and its associated shipping companies, which control, as stated in the report, upwards of 1,500,000 tons of shipping, have brought overseas vast quantities of chilled and frozen meat—millions of animals—at a rate of freight less than 2 cents per pound. As this rate was still in force it was obvious, he said, that the high price of meat could not be laid at the door of the shipping companies. Sir Owen Philipps went on to refer to the highly important question of the provision of tonnage to enable the British steamship companies to hold their own when peace came and competition on the part of present enemies, of neutrals, and of friends was once more unfettered, and expressed the view that the government and Parliament would need to pay particular regard to safeguarding the interests of this great branch of British enterprise. He uttered an emphatic protest against the suggestions in some quarters in favor of nationalization of shipping, and said the adoption of such a policy would prove fatal to Britain's continued supremacy as the premier ocean carrier of the world, as the sea was open to all and shipping would always be subject to the keenest international competition, and with these sentiments most will agree.

British Mercantile Fleet Still Big

After two and a half years of unexampled destruction on the high seas it is still possible to take stock of the British merchant fleet without fear of a disquieting deficit. According to Lord Curzon, the United Kingdom and colonies possessed at the end of June, 1914, 10,124 steamships, with a tonnage of 20,523,706 tons gross. At the end of June, 1915, the number of British and colonial ships then registered had increased to 10,220, with a gross tonnage of 20,830,918. But at the end of 1916, owing to war losses, the number had fallen to 9,757 and the tonnage to 19,765,516. Of course, since the end of 1916 we have lost at a heavier rate, estimated by Lord Curzon at over 5 per cent in tonnage and over 10 per cent in numbers, but only for some four or five months. A net reduction of 5 per cent from the above tonnage still leaves us with a merchant fleet of 18,660,240 tons, and to this must be added about 250,000 tons gross turned out from British shipyards during the first four or five months of this year. That makes the fleet today, at a rough calculation, 19,027,240 tons gross, with the prospect of a steadily increasing output as the year advances. Thus we arrive at a total merchant tonnage today of 19,027,240 tons gross, as compared with 20,523,706 tons gross just before the war. There will be great disappointment in the country if we do not turn out this year a round two million tons deadweight of new ships, and if we do so our fleet would stand at about 21,000,000 tons gross, exclusive of what our colonies are building and what we may acquire by purchase from abroad, but minus the losses which we may yet sustain. The Shipping Controller, it is known, is aiming at three million tons, and one way and another, in all, he may realize about that figure, in which case, even after allowing for losses from mines and submarines, our position would be still better than this estimate.

Freight Space and Non-Essential Cargo

A large firm of merchants makes the suggestion that when steamers arrive at their last port of call enroute for this country, with hold space which there is insufficient cargo on the free list to fill, the vessels should be allowed to load commodities which have been placed on the prohibitive list as not being essentials. The firm suggests that powers should be granted to the local authorities to issue licenses for such exports, and that such authorization should be sufficient to allow the goods to be imported into this country. One result of such importations on a limited scale, which would be not altogether desirable, would presumably be that the importers would be able to demand very high prices for them, but it certainly seems wasteful that, as is alleged, steamers should sometimes leave their last port of call with part of their freight space vacant. In any case, the special circumstances would have to be very carefully examined before any departure from the rule prohibiting "luxury shipments" could now be countenanced.

Motor Hospital Ships

The King recently inspected one of the fleet of motor hospital ships now on service on the Tigris, and it was visited by a party of medical men specially interested in the care of the sick and wounded of his Majesty's forces. The ship, owing to its novel shape, presented a curious contrast with the craft of all kinds among which it lay in a port on the east coast. Its length is no more than 160 feet, its beam about 30 feet, and so slight is the depth of the hull that the three decks, surmounted by a light sun deck, with which it is fitted, seemed to rise sheer out of the water to a great height. The principal factor in the design is the light draught of the vessel which, in that port, was only 2 feet 6 inches, and it is so constructed that when it is engaged on its work of carrying wounded and sick men from the upper shallow reaches of the Tigris to the main base at Basra, its draught will not exceed an additional foot. The vessel is painted white. Flags with the Red Cross fly fore and aft, and the Red Cross is painted on its sides and on the funnel, and high over the sun deck rises the same symbol of mercy and compassion for illumination at night.

The main and upper decks form two hospital wards which can be used for either British or Indian troos. The main deck ward is fitted with tiers of hospital cots, some of them being specially wide and long for the treatment of serious gun-shot fractures, and in the disposition of the cots great care has been taken to give free access to each, so as to facilitate the handling, dressing and nursing of the cases. In order to insure light and free ventilation, with warmth in winter and coolness in the summer, the sides of these lower wards are enclosed with teak framing, having upper panels of splinter-proof glass arranged in the cottage window fashion, and so contrived as to act as wind-catchers in the summer heat and to exclude cold and rain in winter. The flying or upper deck, intended for convalescents, is provided with a promenade and seats.

The speed of the vessel is about ten miles an hour, and as the journey to the base may take from four to eight days, everything needed in a hospital and dispensary is to be found on board. At the fore end of the upper ward there is a spacious operating theater, with an adjoining preparation room equipped with all the necessary fittings for sterilization of surgical equipment and dressings. The accommodation for the medical, nursing, and navigating staffs is separate, and in cabins or compartments, according to rank and duties. Separate cooking arrangements, galleys, and pantries are provided for British patients, and for each of the different castes of Indians. The vessel is equipped with refrigeration plant for supplying ice, and with an aerating four-bottle soda-water machine for making three gross of soda water, lemonade or ginger beer per day. In brief, the vessel is a combination of hospital ship and pleasure boat. It was built for the Inland Waterways and Docks Department of the British War Office.

Union of New Zealand Shipping Fusion

I have to announce the completion of a provisional agreement for a fusion of interests between the P. and O. Company and the Union Steamship Company of New Zealand. On various occasions during the past few years there have been rumors of amalgamations affecting the Union Company. There was, however, nothing improbable in the idea of such an amalgamation when the moment was ripe. The Union Company has the reputation of being an extremely well managed undertaking with a very fine fleet of steamers, and, if any fusion of interest were really inevitable, it is difficult to imagine any being more suitable than one with the P. and O. Company. It will be seen that the arrangement provides for the allotment to each Union Company shareholder of $2.50 P. and O. Deferred stock and $7.50 in cash, representing, on the basis of recent prices, about $15.50. Union Steamship shares have lately been moving up again and on June 19th closed at $15, so that on the face of it the terms would seem to be very satisfactory for the Union shareholders.

Italian Shipowners' Federation

An Italian Shipowners' Federation has been formed at Rome under the chairmanship of Senator Maggiorino Ferraris, a former Minister and president of the Italian Navy League. The Federation has, it is stated, the warm approval of the Italian government, and is supported by such shipping companies as the Navigazione Generale Italiana and La Veloce. Its inception is due to Professor L. Fontana Russo, a member of the High Council of Trade and President of the Council for Commercial Instruction, and the organization is intended to promote the common interests of the Italian Mercantile Marine. The war has, it is declared, shown the need for a development of the mercantile marine, which will be recognized shortly in new legislation, and it is confidently expected that the Shipping Federation will be able considerably to assist the movement.

Ship Repairing Director

Henry M. Grayson has been appointed Director of Ship Repairing Work to the British Admiralty. He is a director of H. and C. Grayson (Limited) and of R. and H. Green, and Silly Weir (Limited). There is now a positive host of new shipping controllers, directors, etc.

Financial and Otherwise

A. O. Andersen & Company announce that their business will hereafter be conducted under the name of A. O. Andersen & Company (California) with the following officers and directors: Arnold Reimann, president; Frank K. Hitching, vice-president and general manager; A. B. Moulder, treasurer; Rufus Thayer, secretary and V. Reimann, director. The shipping business will be under the control of Mr. Frank K. Hitching, and this office will handle the interests of our Scandinavian connections both for the charter and purchase of steamers. The import and export department will be in charge of Mr. A. B. Moulder, who has had ten years' business experience in the Orient. This department is well equipped to negotiate for Japanese, Manchurian, Chinese, Australian and Philippine products.

The annual report on the Columbia river bar and channel work shows for the year 1916 thaa 2104 American and 78 foreign vessels traversed the bar channels in and out, the total net registered tonnage represented being 2,739,132 and the number of passengers carried were 22,006 inbound and 30,204 outbound. The foreign commerce is represented by 199,127 tons valued at $6,525,652 and the domestic commerce by 2,094,465 tons valued at $55,442,522. The eminently satisfactory condition of the Columbia River bar was dealt with at some length in the last issue of this magazine.

GREAT WIRELESS CONTRACT

The United States Navy Department has awarded a contract to the Kilbourne and Clark Manufacturing Company for 200 one-kilowatt radio sets and fifty 2-kilowatt sets. The price is $998,800. This is in addition to an order for sixty-three sets at $123,200 placed recently with the same firm. This means that Kilbourne & Clark are furnishing wireless apparatus for 313 government ships at a total cost of $1,112,000. The manufacturing department of the firm in Seattle will be greatly enlarged to meet the requirements of these large contracts which call for completion of the orders in about nine or ten months time.

The last great contract for wireless equipment was closed in Washington by Frederick G. Simpson, vice-president of the Kilbourne & Clark Company and known throughout the radio telegraphy world as an inventor of wireless mechanism. Mr. R. H. Marriott, Government expert, will inspect the wireless sets and accept same at their point of delivery which is the Puget Sound Navy yard.

CRAMP'S FINANCIAL YEAR

The annual report of the William Cramp Ship and Engine Building Company for April 30, 1917, compares with the previous year as follows:

ASSETS

	1917	1916
Real estate, mach., etc	$15,250,911	$14,230,933
Bills, accts. receivable	2,512,556	1,423,182
Material and supplies	1,035,838	802,262
Cash	435,191	367,306
Defd. assets	7,679	6,081
Total	$19,242,172	$16,829,767

LIABILITIES

	1917	1916
Capital stock	$ 6,098,000	$ 6,098,000
Notes, bonds, mtgs	5,426,444	4,030,444
Wages acts, accrd. int., etc	759,982	1,024,876
P. and L. surplus	6,957,746	5,676,946
Total	$19,242,172	$16,820,767

Referring to the expansion of the plant and general shipbuilding conditions, President Hand's report contained the following:

"The facilities of your yards have been placed at the disposal of the Navy Department and the United States Shipping Board for new construction, but the contracts on hand, both for naval and merchant vessels, will occupy all our capacity until the latter part of 1918.

"The location and physical features of the yard make any enlargement of it impossible, and your directors, mindful of the possibilities of the industry, last year authorized the purchase of about 110 acres of ground on the southern end of Pettys Island, located in the Delaware River immediately opposite the shipyard, with a view of constructing an entirely new and larger shipbuilding plant should business of the future warrant. This site has been offered to the United States Shipping Board for any use they may desire to make of it."

Owing to conditions brought about by the world war, the shipbuilding industry has attained a position of prominence and importance which a few years ago would have been thought impossible and it is likely that for the next few years at least, and probably longer, all the shipyards of this and other countries will be busily engaged in replacing the tonnage which as a result of the war has been destroyed.

NEW UNDERWRITING AGENCY

Northern Underwriting Agency, Inc., is the name of a new concern in the marine insurance business, which has opened offices in the Delmonico Building, 56 Beaver Street, New York. The Northern Underwriting Agency, Inc., are general agents for and will handle the business of the Jefferson Insurance Co., a continuation of the Jefferson Fire Insurance Co. of Philadelphia, which was reorganized April 3, 1917. The officers of the Northern Underwriting Agency, Inc., are Messrs. C. Steendal, president, and John F. Murphy, secretary and treasurer. Both are young men who are not only thoroughly versed in all details of the marine insurance business, but are also favorably known in insurance circles. Mr. Steendal was for thirteen years with Willcox, Peck & Hughes, leaving that concern in January, 1916, to connect with the Hannevig interests who now control the Jefferson. In fact it is understood that it was due to Mr. Steendal that that company was taken over by the interests now in control. Mr. Steendal is a native of Norway and while with Willcox, Peck & Hughes was responsible for building up this concern's extensive connections with underwriters and ship-owners in Scandinavia. The active underwriter of the Northern Underwriting Agency will be Mr. John F. Murphy, who also graduated from Willcox, Peck & Hughes, although for several years before that he was with the New York office of the Thames & Mersey Marine Insurance Co.

The Jefferson Insurance Co. was, under its old name, Jefferson Fire. It was incorporated in Pennsylvania in April, 1855, and started a general fire business throughout this country in August of the same year. It closed its current business in 1912 and reinsured all its policy liabilities in the Firemen's Fund, North River and Pennsylvania Fire Companies. As stated above, a change of ownership took place April 3, 1917, following which the company secured a license from the New York State Insurance Department to do a general marine and inland business. The capital has been increased from $250,000 to $400,000, with a paid up surplus of $100,000. Most of the capital has been invested in U. S. Government one-year certificates convertible into Liberty War Loan Bonds. The present officers of the Jefferson Insurance Co. are Messrs. Christoffer Hannevig, of New York and Norway, president; C. Steendal, New York, vice-president and secretary; and Ralph James M. Bullowa, New York, treasurer. The board of directors consists, in addition to the three gentlemen named above, of Messrs. H. E. Norbom, Philadelphia (president, Pennsylvania Shipbuilding Co., managing director Pusey & Jones Co.); Charles H. Moyer, Philadephia (vice-president, Pennsylvania Shipbuilding Co.); J. Harper Dripps, Philadelphia (president, National Security Bank), and Arthur E. Weil, Philadelphia.

OLD SCHOONER SCRAPPED

The Oliver J. Olson Company's decision to scrap the steam schooner "Arcata" finishes the career of another old timer. The "Arcata" was built in 1876 and is a complete refutation of the charge that a wooden ship has no length of life.

The Northwest Steel Company has arranged with the Port of Portland for a fill adjoining their present shipbuilding ways. This fill will be 425 by 85 feet in extent and will give the shipyard room for the installation of another building berth.

The Craig Shipbuilding Company of Long Beach, California, is building two steamers for Swayne & Hoyt. The vessels will be 245 feet between perpendiculars, 41 feet 6 inches beam and 14 feet moulded depth. They will be fitted with triple expansion engines. It is also understood that this concern will construct two steamers for the U. S. Shipping Board.

The newly organized Seattle Steamship Company's officers are H. F. Ostrander, president; W. C. Dawson, vice-president; C. W. Wiley of the Seattle Construction and Dry Dock Company, vice-president, and Carl D. Phillipp, assistant manager.

According to official returns 9,562 vessels with a total tonnage of 20,363,513 entered Japanese ports during 1916. This is an increase of 888 vessels over the 1915 record and shows that the war has had little effect on the total of Japanese clearances.

The Emerald Line is finding business to be on the increase and are searching for additional tonnage to put on the San Francisco, Coos Bay, Eureka and Portland runs.

Consolidation of all the floating property of the Oregon-Washington Railroad & Navigation Co. under the management of the San Francisco & Portland Steamship Co. is eported. This will mean that the local concern will have charge of the Columbia River steamers "Harvest Queen," "Hassalo" and "T. J. Potter"; the "Nahcotta," which has been plying between Astoria and Megler; the Snake River steamers "Spokane" and "Lewiston" and the steamer "Harrison" on Lake Coeur d'Alene. The change of control in the management is made in the interests of economy.

The directors of the Crowell & Thurlow Steamship Company of Boston declared a dividend of $20 per share which was paid on June 30. The two previous quarterly dividends were $12.50 per share. The stock of the company, put out at $100 a share, has received $45 in dividends during the past nine months and is now quoted around $500.

A WOODEN SHIPBUILDING ACHIEVEMENT

On May 18th, Philip D. Sloan of the Sloan Shipyards Corporation received contracts for sixteen complete wooden ships of the Ferris design for the U. S. Shipping Board and on May 25th the laying of keels for two of these vessels was under way. As far as we know, this latter date gives the Sloan yards the distinction of starting the first actual new construction for the government on the wooden shipbuilding program.

The Sloan shipbuilding yard at Olympia, Washington, is one of the best equipped plants on the coast. At the present time there are four motorships under construction and two of the government standard wooden freighters. Two additional building ways, making eight in all, are being installed and government keels will be laid as soon as these are ready.

The entire record of the plant has been a remarkable one as far as time is concerned. The yard is built out over the water on piling and while the first pile was driven March 2nd the keel for the first motorship was driven on April 20. In short, the Sloan Shipyards Corporation has organized a force, built a shipyard that required the driving of thousands of piles and laid their first six keels all within ninety days.

A short time ago the corporation purchased the Capital City Iron Works of Olympia and is now enlarging that plant to build auxiliary machinery for the vessels and equipment for the shipyard. A large new machine shop is nearing completion and a steel foundry will shortly be added to this plant. The machine shop is 140 by 40 feet in size and two stories high. It will be equipped with the latest tools and a complete overhead handling equipment. The Sloan Corporation intend eventually to build both the machiner yand boilers for the vessels they construct.

Mr. Philip D. Sloan, head of the Sloan Shipyards Corporation.

The Sloan Corporation is strong financially, as associated with Mr. Sloan in the enterprise are such men as Antonio C. Pessano, president of the Great Lakes Engineering Works of Detroit, Michigan and vice-president of the American Bureau of Shipping. The management of the Sloan yard believe that they will be able to turn over their first completed government ship in January and that they will be fully a month ahead of their scheduled deliveries on the others.

NEW SHIP INFORMATION TABOO

General Goethals, general manager of the Emergency Fleet Corporation, has issued the following:

As a war measure the government has found it necessary to adopt the policy of discouraging in every reasonable way the publication and dissemination of information in regard to merchant marine ship construction that might aid or influence the military plans of the enemy in the present emergency.

To conform to this policy the United States Shipping Board Emergency Fleet Corporation hereafter will not be able to give out for publication or other use any information relating to the number, size or character of vessels under contract, the place where they are being built and by whom, the percentage of completion, date of final completion, etc.

Great Work of a Great Body

THE Council of National Defense, though created under the Act of Congress approved August 29, 1916, was not fully organized for business until March 1, 1917. Since that date its record has been one of steady, consistent growth.

The Council of National Defense is composed as follows:

Secretary of War, Newton D. Baker, chairman; Secretary of the Navy, Josephus Daniels; Secretary of the Interior, Franklin K. Lane; Secretary of Agriculture, David F. Houston; Secretary of Commerce, Wm. C. Redfield; Secretary of Labor, Wm. B. Wilson.

The members of the Advisory Commission are:

Daniel Willard, chairman; president of the Baltimore and Ohio Railroad—Transportation and communication.

Howard E. Coffin, vice-president of the Hudson Motor Company—Munitions, manufacturing, including standardization and industrial relations.

Julius Rosenwald, president of Sears, Roebuck and Company—Supplies, including clothing.

Bernard M. Baruch, financier—Raw materials, minerals and metals

Dr. Hollis Godfrey, president of the Drexel Institute—Engineering and education.

Samuel Gompers, president of the American Federation of Labor—Labor, including conservation of health and welfare of workers.

Dr. Franklin Martin, secretary general of the American College of Surgeons—Medicine, surgery and sanitation.

The Director of the Council and Advisory Commission is Walter S. Gifford, and the Secretary of the Council and Advisory Commission is Grosvenor B. Clarkson.

Under both Council and Commission there have been created various boards, sections and committees. The work and accomplishments of the subordinate bodies under the Council will herein first be dealt with.

The General Munitions Board

On April 9, 1917, the General Munitions Board began its work under orders of the Council of National Defense. Its chairman is Frank A. Scott, vice-president of the Warner & Swasey Company, an acknowledged authority in the production of munitions for the uses of modern war ;and it is composed of seventeen qualified representatives of the War and Navy Departments, and six civilians exclusive of the chairman.

The subjects dealt with by the Board and some of the results so far obtained are as follows:

Small Arms—Rifle Contracts: Conferences with manufacturers held; enough capacity to supply 1,000,000 men developed; contract form drawn satisfactory to and signed by Chief of Ordnance.

Small Arms—Ammunition Contracts: Contracts covering supply for ammunition for small arms have been drawn and a sufficient amount and suitable deliveries have been secured.

Artillery—Ammunition: Conferences with manufacturers held; general price situation discussed; specifications in some cases modified; sufficient supply developed; and type of contract to be used arrived at.

Gun Forgings: Conferences with manufacturers held; expansion of manufacturing facilities developed; method for reimbursing manufacturers for expansion satisfactory to manufacturers arranged for; manufacture of guns already begun.

Machining of Gun Forgings 3" to 6": Conferences with manufacturers held; possible sources of supplies discovered and developed sufficient facilities found.

Gun Carriages, Limbers, Caissons, Forge Wagons: Conferences with manufacturers held; sources of supply in process of development, and raw material secured.

Military Vehicles—Aside from Motor Transport: Conferences with manufacturers held; sufficient sources of supply developed; specifications modified and standardized; seasoned timber secured.

Motor Transport—Including Ambulances and Armored Cars: Conferences held with manufacturers; standardization of type secured; supply of material for ambulance bodies arranged for. A satisfactory production of armored cars was arranged for by the Ordnance Department.

Machine Guns: A reduction in prices to be paid for machine guns needed for the Army and Navy has been secured, accomplished by conferences with manufacturers. Work is going forward to increase production of these guns.

Armor-piercing Shells: A method for payment on the various size projectiles was developed and suggested.

Cotton Duck for tentage—cots and infantry equipment:

Manufacturers of cotton duck were assisted in creating a sufficient supply of duck for haversacks in time to meet the needs of the army.

Raw Materials—including metals, lumber, leather, high explosives:

Committees on these subjects have taken the necessary steps toward securing a sufficient supply.

Medical Supplies—Including surgical instruments:

Conferences with manufacturers were held and means for reducing the requirements of the civil and Army and Navy branches to a minimum were discussed. The supply of surgical instruments, etc. is being arranged for.

Stores Work: Arrangements have been made for the tuition of large numbers of men anxious to enter the storage branch of the service; storage bases have likewise been developed.

Cantonment Work: Form of contract has been drawn satisfactory to Quartermaster's Department and contractors. Certain suggestions have likewise been submitted to facilitate construction and create a saving.

Optical Glass—Military Instruments: After thorough investigation a shortage of this material was found, and steps are now being taken to standardize and eliminate instruments not absolutely necessary ,and to arrange for increased production.

Recommendations of Fair and Just Prices: The Board has been called upon to make recommendations upon prices submitted the Army and Navy and Quartermaster's Department as to whether these prices were fair and just. In each case these recommendations have been made.

Adjustment with British Government on small arm factories in this country. An adjustment has been made with the British Government covering purchase by the United States Government of machinery and equipment in British small arms factories in this country.

Program of Conferences with English Commissioners: The Secretary of the Board has arranged a program of conferences between representatives of various War and Navy Departments and the visiting British Commissioners, to discuss various technical subjects pertaining to their departments.

Establishment of Priority in machine tool orders and demand for other material: In cases when called upon by the Army and Navy this Board has instructed certain manufacturers to give precedence to machine tools desired in connection with urgent governmental work; and likewise has decided between the needs of private industry and those of the War and Navy Departments.

Investigation of Guages: This Board has investigated the status of military materials in this country and in Canada; arrangements have been made with the Bureau of Standards for calibrating gauges and for the care and custody of master gauges.

Compilation of Statistics: A confidential list of approximately 660 manufacturers of munition and kindred articles has been prepared and sumbitted to the War and Navy Departments for their guidance in purchasing such material.

The General Munitions Board has since its organization, through the coordination of purchasing alone, saved many millions of dollars to the government.

Munitions Standard Board

On March 20, 1917, the Council of National Defense formally created the Munitions Standards Board, previously organized by Commissioner Coffin, the Advisory member on Munition work. Its purposes being to standardize munitions specifications, in so far as possible to permit of quantity production of munitions at the most reasonable prices obtainable. The following experts were appointed to compose the Board:

Frank A. Scott of the Warner and Swasey Company, Cleveland, manufacturers of automatic machinery and optical instruments, chairman;

W. H. Vandervoort, of Root & Vandervoort, builders of special machine tools, and president of the Moline Automobile Company.

E. A. Deeds, formerly general manager of the National Cash Register Company, president of the Dayton Engineering Company, and interested in many industrial activities;

Francis Pratt of the General Electric Company, Schenectady;

Samuel Vauclain of the Baldwin Locomotive Works, Remington and Westinghouse companies;

John N. Otterson, vice-president, Winchester Arms Company;

Careful investigations have been made and meetings held with manufacturers of shells, machine guns, etc. with resulting introduction of modifications in specification and design to permit of greater quantity of production. A comprehensive list of manufacturing concerns who had been and were manufacturing munitions for the Allies, was compiled for confidential use and the productive capacity of the country along these lines was developed and tabulated.

Air Craft Production Board

A condensed report of the work already accomplished in connection with aircraft production under the Air Craft Production Board or under direction of its chairman previous to organization of the board itself follows:

Assisted in the organization of the Pan-American Aeronautical Exposition in New York last February.

Assisted in organizing the aircraft manufacturers into an association.

Negotiated with the Wright-Martin Aircraft Corporation and Curtiss Aeroplane Company and others to secure a basis for the settlement of the airplane patent situation. Agreement has been reached between the parties at interest subject to the preparation of proper legal cross-licensing agreement.

Evolved in co-operation with the chief signal officer a training plan for aviators.

Assembled the presidents of six military engineering universities and assisted in starting six schools for the preliminary training of aviator cadets.

Arranged for the sending of professors to take instruction at Toronto on this cadet instruction work.

Development in co-operation with the chief signal officer and the Aeronautical Division a standard type of aviation school buildings and equipment of buildings.

Arranged for complete working drawings, estimates of cost, etc.

Assisted the Aeronautical Division in investigating sites for aviation schools.

Investigated the production facilities of aeroplanes in the United States and made recommendations to the chief signal officer covering orders that should be placed at once.

Assisted in the preparation of leases covering training fields authorized by the War Department.

Arranged for standardization of training type of machine between English, Canadian and United States service.

Plans for battle types of machines are being developed and orders for machines are actually being placed by the military authorities.

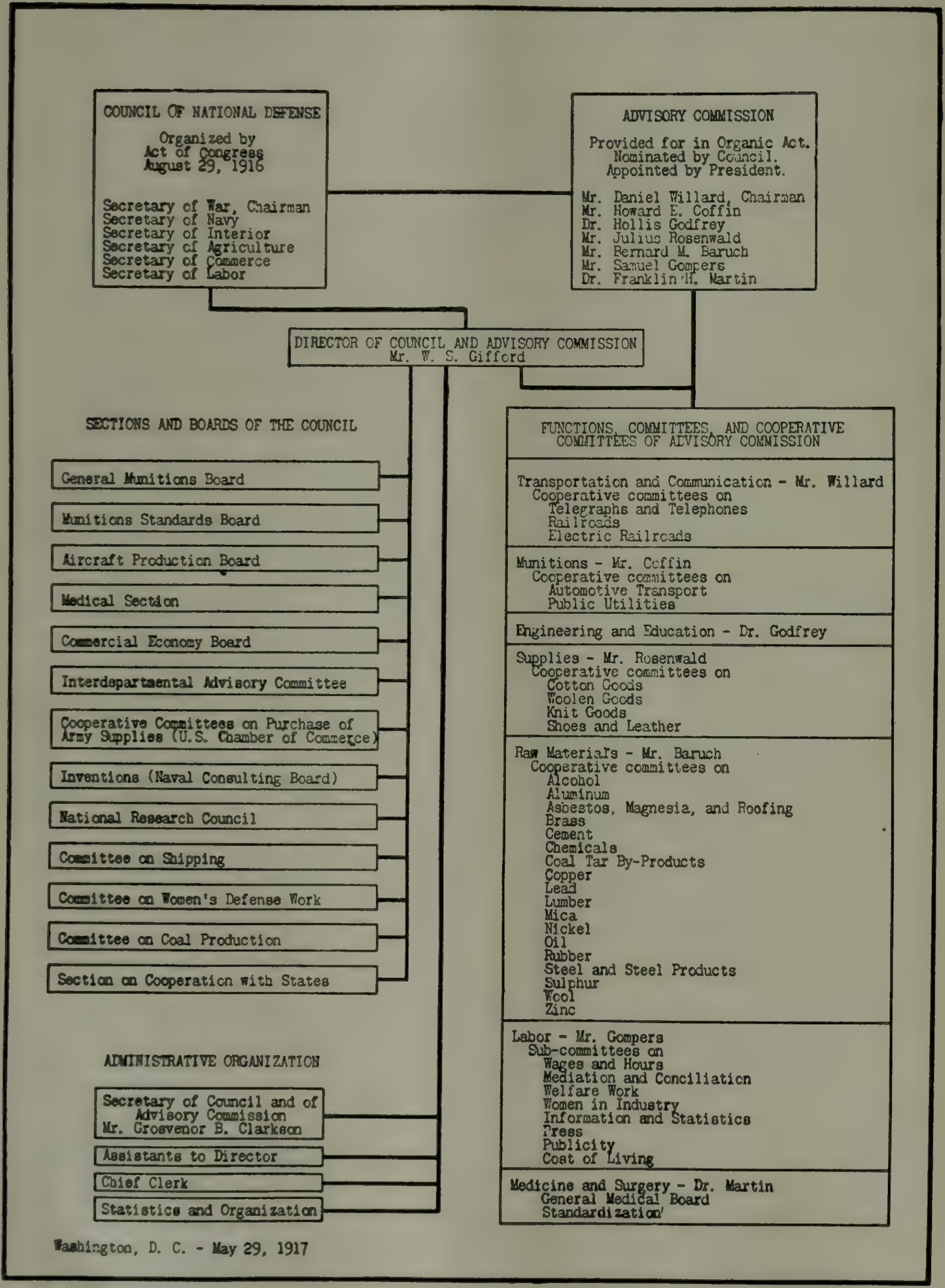
Inventions

(Naval Consulting Board of the United States.)

The Naval Consulting Board of the United States, headed by Thomas A. Edison, and composed of eminent scientists and inventors, acts as a board of inventions for the Council of National Defense. The Board is now, and has been for some time, actively engaged in the investigations of plans to counteract the submarine menace.

Committee on Coal Production

Under the chairmanship of F. S. Peabody, president of the Peabody Coal Company of Chicago, the Committee on Coal Production, recently formed, has already accomplished marked definite results. The Department of Labor, with the assistance of the American Federation of Labor and the co-operation of the Committee on Coal Production, has already settled serious difficulties which have arisen between operators and miners in various localities, notably No. 2 District in Pennsylvania. Conferences have been held with the Department of the Interior, resulting in the issuance of a departmental order discontinuing long hauls of cars carrying coal to Indian schools and agencies when



COUNCIL OF NATIONAL DEFENSE
Organized by
Act of Congress
August 29, 1916

Secretary of War, Chairman
Secretary of Navy
Secretary of Interior
Secretary of Agriculture
Secretary of Commerce
Secretary of Labor

ADVISORY COMMISSION
Provided for in Organic Act.
Nominated by Council.
Appointed by President.

Mr. Daniel Willard, Chairman
Mr. Howard E. Coffin
Dr. Hollis Godfrey
Mr. Julius Rosenwald
Mr. Bernard M. Baruch
Mr. Samuel Gompers
Dr. Franklin H. Martin

DIRECTOR OF COUNCIL AND ADVISORY COMMISSION
Mr. W. S. Gifford

SECTIONS AND BOARDS OF THE COUNCIL

- General Munitions Board
- Munitions Standards Board
- Aircraft Production Board
- Medical Section
- Commercial Economy Board
- Interdepartmental Advisory Committee
- Cooperative Committees on Purchase of Army Supplies (U.S. Chamber of Commerce)
- Inventions (Naval Consulting Board)
- National Research Council
- Committee on Shipping
- Committee on Women's Defense Work
- Committee on Coal Production
- Section on Cooperation with States

FUNCTIONS, COMMITTEES, AND COOPERATIVE COMMITTEES OF ADVISORY COMMISSION

Transportation and Communication - Mr. Willard
  Cooperative committees on
    Telegraphs and Telephones
    Railroads
    Electric Railroads

Munitions - Mr. Coffin
  Cooperative committees on
    Automotive Transport
    Public Utilities

Engineering and Education - Dr. Godfrey

Supplies - Mr. Rosenwald
  Cooperative committees on
    Cotton Goods
    Woolen Goods
    Knit Goods
    Shoes and Leather

Raw Materials - Mr. Baruch
  Cooperative committees on
    Alcohol
    Aluminum
    Asbestos, Magnesia, and Roofing
    Brass
    Cement
    Chemicals
    Coal Tar By-Products
    Copper
    Lead
    Lumber
    Mica
    Nickel
    Oil
    Rubber
    Steel and Steel Products
    Sulphur
    Wool
    Zinc

Labor - Mr. Gompers
  Sub-committees on
    Wages and Hours
    Mediation and Conciliation
    Welfare Work
    Women in Industry
    Information and Statistics
    Press
    Publicity
    Cost of Living

Medicine and Surgery - Dr. Martin
  General Medical Board
  Standardization

ADMINISTRATIVE ORGANIZATION

- Secretary of Council and of Advisory Commission
  Mr. Grosvenor B. Clarkson
- Assistants to Director
- Chief Clerk
- Statistics and Organization

Washington, D. C. - May 29, 1917

Diagram showing centralization of management of the Council of National Defense and its Advisory Committee.

nearby coal sources could as well be used, thus releasing the cars for more important movements. The committee is in constant conference with the Navy Department on the subject of coal for battleships. Action has been taken to increase the facilities for handling and storing government coal at Galveston and Texas City, Texas. Conferences with local coal dealers of Washington, D. C., on the supply of coal for public buildings in Washington, have resulted in a promise from the producers of a sufficient supply to cover the Government's requirements.

Another conference of Lake shippers of coal and ore, railroad representatives and the representatives of Lake vessels, to determine how to consolidate cargoes of coal so as to avoid holding both cars and vessels for the accumulation of individual cargoes, resulted, the committee believes, in a solution of the problem satisfactory to all interests—a solution which will probably increase the ability of shippers, railroads, and vessels to carry to the head of the lakes some additional two and one-half million tons of coal and bring in return the same tonnage of iron ore.

National Research Council

At the request of the Council of National Defense, the National Research Council is maintaining in Washington an active committee under the direction of Dr. George E. Hale and Dr. R. A. Millikan, for the purpose of co-operating with the Council of National Defense in matters pertaining to scientific research for the national defense. The National Research Council has made a close-knit organization of the scientific forces of the country and represents all of the more important scientific bodies, as well as the scientific bureaus of the Government in their research capacities. It was organized by the National Academy of Sciences at the request of the President of the United States for the purpose of co-ordinating and stimulating the research activities in the United States in the fields of science and engineering. The National Research Council is at present engaged in such investigations as the study of devices for detecting completely submerged submarines and mines; range finders of various types; devices for detecting invisible aircraft and sapping parties; improvements in wireless apparatus and other instruments used with aircraft; military photography, prevention of corrosion and electrolytic action on the hulls of vessels; balloon fabrics; fabrics for army slickers; new explosives; and utiliaztion of wastes and by-products. The committee on nitrate supply appointed at the request of the Secretary of War to consider the process to be used by the Government in its plant for producing nitrates for explosives and fertilizers, has submitted a full report. Through the co-operation of the Bureau of Standards and the geophysical laboratory of the Carnegie Institute with glass manufacturers, the problem of supplying the optical glass for military purposes is well advanced toward solution. Other vital matters which are being fully investigated are anti-toxins and serums for diphtheria, tetanus, pneumonia, dysentery and meningitis; intradermal method of vaccinating for smallpox; polyvalent vaccines for typhoid fever; sterilization of drinking water, soldiers' clothing and blankets; infected wounds; shock, fatigue; occupational diseases, with special reference to munition workers; protection of the ear from high explosives; and study of noxious gases and methods of protection against them.

Committee on Shipping

To advise the United States Shipping Board and to report through the chairman thereof to the Council of National Defense as to the best methods of increasing the tonnage available for shipment to the Allies, a Committee on Shipping has been created by the Council of National Defense.

Committees of or Associated with the Advisory Commission

The Advisory Commission, which is a body of seven civilians appointed by the President, the members of which serve in an advisory capacity without compensation, have formed or caused to be formed various committees. Their duties and accomplishments to date are as follows:

Transportation and Communication

At the instance of Commissioner Daniel Willard the railroads of the country have been completely mobilized for the nation's defense. A special committee on national defense of the American Railway Association, comprising the leading railroad executives of the United States, has been formed, and its machinery has been in motion for a number of weeks. The executive committee of this special committee is composed of Fairfax Harrison, chairman; Howard Elliott, Hale Holden, Julius Kruttschnitt, Samuel Rea, and Daniel Willard, and Edgar E. Clark, of the Interstate Commerce Commission, ex-officio. This executive committee has established permanent headquarters in Washington with the necessary staff of experts and office employees at the expense of the railways of the United States, and is practically in continuous session. The special committee, itself, is subdivided over the country into six departments, each to correspond to one of the military departments of the Army. The personnel of these departmental bodies is made up in each case of from four to seven railroad executives. There are in turn subcommittees on car service, military equipment standards, military transportation accounting, military passenger tariffs, military freight tariffs, and materials and supplies, each of these committees being composed of highly qualified transportation executives. The special committee has adopted the broadest attitude in connection with the public interest. It has, among other things, declared that an emergency exists which requires that coal be given preference in car supply and movement; it has issued necessary instructions to the railways that the movement of ore be preferential, second only to coal; it has caused to be modified the car service rules to facilitate the free movement of freight so as to permit a larger latitude in the handling of box cars in the interest of national efficiency as distinguished from that of individual railroads; and the special committee has certified to the Council of National Defense that in its judgment certain preference should be given to the movement of fuel as follows:

First—Fuel for the United States Government.

Second—Fuel for the roads upon which mines are located.

Third—Fuel for steam railroads other than those upon which mines are located.

Fourth—Fuel for other purposes.

At Mr. Willard's request, the committee submitted suggestions to the Council of National Defense as to persons to compose the proposed railroad commission to visit Russia and recommend methods for the operation of the Siberian railroads. The Advisory Commission of the Council of National Defense was advised that it was the sense of the special committee that conventions bringing large bodies of persons to one point should be discouraged in the interest of conservation of fuel, to avoid congestion, to prevent interruption to necessary freight traffic and to conserve equipment and energies which must be applied to the accomplishment of transportation requirements of the country. The special committee has arranged for active study on the part of the department committees of

(a) Distribution of power as between railroads;
(b) Adjustment of passenger train service in accordance with national requirements.

Other accomplishments of the special defense committee are as follows:

The issuance to the railways of a bulletin indicating ways in which added efficiency might be obtained by individual roads; the initiation of a movement for the pooling of coal of like characteristics at Lake ports in the interest of efficiency and expedition of movement; the undertaking of the enlistment of the nine reserve engineer regiments, composed of skilled railway workers, to aid in the rehabilitation of the railways of France as well as in the operation of the French railways behind the English lines; an arrangement for the movement of coal for naval use from mines in West Virginia to the Pacific Coast in box cars instead of in open cars, in order to prevent the uneconomical empty haul of open cars from Pacific Coast points to the East; the handling of a vast number of requests for priority in car supply and in movement, these questions having been brought to the attention of the special committee by agencies of the Government, Members of Congress and commercial interests; the preliminary work on relocation of cars so as to produce the largest measure of transportation; the perfection, in connection with the proper officers of the Army, of a complete scheme of co-operation in the movement of troops and supplies of every description. The definite practical expedition of movement of food products, following on many conferences with representatives of the Allies and of the Department of Agriculture.

The special committee has also under way, among other things:

(a) Through negotiations with the National Industrial Traffic League, a representative body of shippers, the formation of a committee of shippers to co-operate with the special committee;
(b) The simplification of tariffs covering the movement of impedimenta for troops;
(c) The list of available routes between specified points for the use of military authorities.

Mr. Willard has assisted in the creation of a committee (of which Mr. John Stephens, one time Chief Engineer of the Panama Canal, is chairman, and four other men prominent in railroad work are members) which has gone to Russia, properly accredited by the President to call on Russian officials. They will be met at Vladivostok and go over the road to find out what particular things are needed in the way of equipment that we can furnish, and what materials or men we can send that will be helpful.

Telephone and Telegraph Committee

With regard to the utilization of the telephone and telegraph systems of the country for the Government's needs, the vital thing, fully realized by both federal officers and the wire companies, has been to perfect a co-ordination to insure complete co-operation, not only between the Government and the companies, but between the companies themselves with regard to communications and censorship of communications. That was all arranged for some two months ago, at the instance of Mr. Willard, chiefly through the instrumentality of Theodore N. Vail, president of the American Telephone & Telegraph Company, who acts as chairman of this committee. Elaborate plans have been worked out already throughout the United States, all Government toll calls having been given precedence over official messages. The giving of this special service requires extraordinary action on the part of the telephone officials everywhere, including the special drilling of some 12,000 long-line operators in different parts of the country. The long-distance facilities out of Washington have been increased from 148 wires to 294 wires, and plans are now being made for a still further increase. Good telephone service can be given between Washington and the headquarters of every department and naval district in the United States. Provision has been made for handling telephone calls promptly, even with a large increase in business between the various army department headquarters and the state capitals, the army posts and the national and state mobilization camps in each military department. Extensive methods have been devised for special telephone and telegraph wire systems for the exclusive use of the War, Navy and other departments of the Government. More than 10,000 miles of special system have already been taken from commercial use and devoted exclusively to the service of the Navy, Agriculture and other executive departments. A very comprehensive system for the War Department has been evolved and will be put into service upon the call of the chief signal officer of the Army. Plans are being rapidly executed to increase the local telephone facilities of Washington; an entirely new central office with an ultimate capacity of 10,000 lines is being installed. Provision has already been made for the construction of telephone systems in the mobiliaztion camps. Active assistance has been given by the Bell System to the U. S. Coast Guard officials, and plans made for providing telephone connections at approximately 100 lighthouses and 200 Coast Guard stations, involving the laying of some 300 miles of submarine cable, constructing more than 650 miles of pole line, and stringing more than 1200 miles of wire. Special facilities have been provided for the National Guard, particularly in connection with guarding important railroad points, bridges, and water-supply systems. Even more extensive plans have been put into effect in co-operation with the Navy with brilliant success.

Committee on Supplies

The function of the Committee on Supplies, of which the chairman is Julius Rosenwald, president of Sears, Roebuck & Company, of Chicago, is to có-operate with the purchasing bureaus of the War and Navy departments, to advise and assist them in the procurement of necessary clothing, equipment and food, and as far as possible to coordinate the buying of the respective departments in these directions. The committee is composed of six men chosene from different lines of business, who are devoting their entire time to the work of the committee without compensation. Associated with them are two officers of the Army, familiar with purchasing problems. The work of the Committee on Supplies may perhaps best be instanced by relating its action in an advisory capacity in connection with the method employed by the War and Navy Departments in purchasing supplies through advertising and circulars to bidders. The Committee on Supplies advanced that this method, while perhaps satisfactory in peace times, embodied very serious disadvantages in time of war in view of the multiplied need of the government. Hence, the committee advised the purchasing departments of the government that the system of advertisement and bids would necessarily tend to a stimulation of the market with a resultant inflation of prices. On April 12, 1917, the Secretary of War declared that an emergency existed within the meaning of Section 3709 of the Revised Statutes, and ordered that contracts be made without advertising for bids. The Committee has likewise endeavored with some success, through the General Munitions Board, to coordinate the requirements and purchases of the various departments so as to reduce to a minimum, or to eliminate altogether, the possibility of the government being a direct competitor of itself by the purchase of supplies through separate channels. Specifications of many of the items required by the government were written at a time when needs were small and conditions of world trade normal. Radical changes have become necessary since this country entered the war, in the specifications for textiles, shoes and other items. A limited supply of raw materials and the needs of our allies have made immediate action imperative. Therefore the committee has cooperated with the proper departments in drafting new specifications which would provide the best possible substitutes for articles difficult or impossible to obtain in the requisite quantities.

The Committee on Supplies has wherever possible assisted the purchasing officers to deal directly with the prime producers of the articles needed. In the judgment of the committee a purchaser of the size of the United States needs the services of no middlemen to secure its supplies. In this scope of its work the committee has been subjected to crticism of dealers and army contractors who have in the past secured options on supplies which they knew the government would need, and which they have then offered to the government at an increased price.

In many instances the Committee on Supplies has been able to "peg" the price of supplies required in large quantities by the government at figures existing at the beginning of the war, or in some cases at figures lower than those prevailing at the time. The committee has also secured options for the government on large supplies of leather and other materials required at prices in effect at the beginning of the war, available for the government's acceptance at periods of from four to six months.

The Committee on Supplies has caused to be created to advise and assist it cooperative committees in the cotton, woolen, shoe and leather, knit goods and mattress industries. With the assistance of these committees, the Committee on Supplies has been able to mobolize those industries for the service of the government, to bring to the purchasing departments of the government the services of many mills and factories which had never before produced government goods and which would not now be in the market for the government goods were they not asked by this committee for patriotic reasons to place a portion of their plants at the disposal of the government. In this way the committee has been able to enlarge the field in which the purchasing departments of the government are able to buy, and also to increase the deliveries.

Raw Materials, Minerals and Metals

This committee, headed by Bernard M. Baruch, has organized the field with regard to raw materials, minerals and metals in the following industries: Alcohol, aluminum, asbestos, magnesia and roofing, brass, cement, chemicals, coal tar byproducts, copper, lead, lumber, mica, nickel, oil, pig iron, iron ore and lake transportation, rubber, steel and steel products, sulphur, wool and zinc

Cooperative committees have been formed under the foregoing headings. Several of the committees maintain representatives in Washington in order to keep in close touch with the executive departments of the government, and the chairman of all of the cooperative committees visit Washington from time to time and get in touch with the departments with which they have to deal. Their endeavor is to become acquainted with the requirements of the government departments and their specifications, and in every way possible be helpful. While those committees were formed to mobilize the industries in given fields and to act only in an advisory capacity, experience has shown that they have been of great immediate value to the government in perfecting early deliveries and in the making of lower-than-market prices.

The concrete accomplishments of the Committee on Raw Materials, Minerals and Metals, may be itemized as follows:

(a) Forty-five thousand pounds of copper have been offered to the government by the copper interests, acting at the instance of this committee, at an approximate saving to the government of $10,000,000. It is the belief of this Committee that through this agency hundreds of millions of pounds of copper required by the Allies and our own departments such as the Army, Navy and the Panama Canal Commission, can be bought at prices that will show an enormous saving.

(b) The cooperative committee on zinc has already contracted for some 25,000,000 pounds of zinc at practically two-thirds of the market price, and is prepared to use its efforts to affect still further savings on the vast quantities that must be purchased.

(c) Through the cooperative committee on steel the Navy Department contracted for several hundred thousand tons of ship plates and other materials at great concessions. When ship plates were selling at $160 a ton, the Navy bought them at $58 a ton.

(d) The cooperative committee on aluminum purchased for the government its need of aluminum at 27½ cents per pound, when the regular price of the sellers to large purchasers was 38 cents, and the market price was 60 cents per pound.

(e) The cooperative committee on chemicals is now engaged in negotiations with the fertilizer interests of the country which will stabilize and lower prices.

(f) The cooperative committee on oil has closed contracts, for the delivery of oil to the Navy, of a highly satisfactory nature with regard to prices and deliveries.

Munitions and Manufacturing (Including Standardization), and Industrial Relations

The Council of National Defense has in its files more than 27,000 detailed reports from the larger manufacturing plants of the country as to capacity of those plants to meet the military and industrial needs of the government in time of war. This vast fund of information was collected by the Committee on Industrial Preparedness of the Naval Consulting Board of the United States, said committee being headed by Mr. Coffin, and all of the records are now under Mr. Coffin's branch of the work in the Advisory Commission of the Council of National Defense.

Under Mr. Coffin are concentrated the activities of a body known as the Committee on Automotive Transport which has to do with truck specifications for the War Department, the training of truckmasters and chauffeurs, military truck tires, motorization of field artillery, volunteer motor truck companies, matters of personnel, matters dealing with engine and transmission manufacturers and with drop forge managers, and the necessities of tractor manufacture in connection with the food problem.

On May 14, 1917, a conference of fifteen chief engineers, representing the principal truck manufacturers of the United States, and held in the rooms of the committee under the auspices of the Society of Automotive Engineers, resulted in a complete standardization of many of the salient details as to special equipment demanded by the Quartermaster's Department on trucks for war service. Great uniformity was obtained, even in those details not completely standardized. This marks the entering wedge of a completely standardized military truck. A still more important and possibly far-reaching effect of the meeting was the agreement arrived at to cooperate in the purchase of the particular parts under consideration. The cost, for instance, of designing and duplicating the die and tool equipment for making each new type of towing hook or guard may exceed a thousand dollars, although the number of pieces needed for any one manufacturer is relatively small. It is hoped to save all of this overhead by concentrating upon one type which will be satisfactory to all the engineers concerned and which can be produced economically in quantities sufficient for all the Army needs by a relatively small number of sources of supply. In the aggregate this constitutes a large saving to the Government and makes it possible for the engineers to focus their labors on the production of essential developments. The office of the Quartermaster General has expressed approval of, and is cooperating in, a plan put forfard by the committee to furnish truckmasters and chauffeurs in sufficient numbers. This work embraces the coordination of schools and private concerns so far as possible in the direction of stimulating enlistment in the reserve corps and in giving proper instructions to round off the preparation of thousands of passenger car drivers into truck drivers.

This Committee had arranged through the office of the Quartermaster General for prompt delivery of the steel necessary in the equipment of demountable tires, many technical complications having been cleared away.

The Volunteer Non-Paid Servants of the Council of National Defense and the Advisory Commission

The work of the Council of National Defense is largely carried on through the assistance of civilians who serve without pay. Their services have been obtained in the full realization that the conduct of modern war enlists the non-partisan specialists of every industry and every science, and in the realization that wars are now won not only by fighting men but also by coordinated industries.

In the service of the Council and Advisory Commission, with the labors of both bodies touching about every angle of the nation's life, there are but eighty paid employees. Almost all of these are clerks and stenographers. A task similar to that with which the Congress has charged the Council and Advisory Commission can be carried on with so small a salary roll only by the volunteer service of civilians above referred to. Of these there are more than one hundred men of the most highly trained type, drawn from the fields of every industry and science the expert knowledge from which it is absolutely vital to obtain and utilize in the present national emergency. These one hundred men are giving their entire time to the Council and Commission without compensation. They themselves pay their living expenses in Washington. In addition there are several hundred more men of the same type giving free a large part of their time to the work, not only in Washington, but throughout the country. It cannot be made too clear that the Council and Advisory Commission are enabled to carry on their labors at so low a cost only through the ungrudging aid of these volunteer, non-paid workers, representative in very great measure of the trained brain power of the nation.

Very respectfully,
(Signed) W. S. GIFFORD,
Director of the Council of National Defense
and of the Advisory Commission.

The Banning Shipyard on Mormon Island, San Pedro, California, will build two standard wooden ships for the U. S. Shipping Board.

East Bay Plant Doing Wide Business

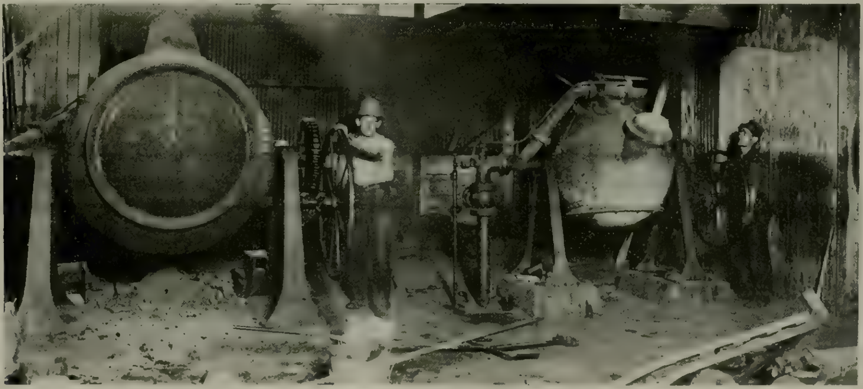
A WIDE assortment of work can be found at the present time in the shops of the Dow Pump and Diesel Engine Company of Alameda, California. This concern's many years of experience as builders of high grade marine pumps has resulted naturally in a flood of marine orders among which are a number of special pumps for the new Government battleships, cruisers and fuel ships now building in Eastern yards. So heavy is the demand for the Dow pumps at this time that nearly 80 per cent of the productive capacity of the big Alameda plant is devoted to turning out pumps of the marine type.

The Diesel engine department of the Dow plant has under way two 320-horsepower reversible Dow engines of the full Diesel type for a new motorship building by the G. M. Standifer Construction Company for Libby, McNeill & Libby. Peculiar interest attaches to this installation, as reduction gears will be fitted. The engines will operate at 250 revolutions and the propellers at 100, the reduction being accomplished through herrinbone gears made by The Falk Company of Milwaukee. In adapting the Dow-Williams engine to marine use, the Dow management has moved with extreme caution both in the matter of design and experiment. The result has been that their marine engine as offered the shipowners has had every questionable element in design and construction eliminated. The time occupied in experimental work, however, was productive of still other good results since it enabled this firm to complete designs for standard sizes which will deliver 220, 250, 320, 500, 670 and 1000 horsepower per unit, and of course double these powers for twin-screw installations. This furnishes a power range calculated to cover practically every need of the auxiliary or full-powered modern freight carrier. A full description of these engines together with full load tests of the 200-horsepower stationary Dow Diesels installed in the National Ice and Cold Storage Company's plant in San Francisco was published in the May, 1917, issue of the Pacific Marine Review.

In order that the study of the Dow Diesel might be carried on at all times under actual working conditions, a 160 horse-power, three cylinder Diesel was built and installed at the Alameda plant to furnish electric current for use in driving the machines in the shops. A great deal of valuable experimental work was carried out with this engine in order to ascertain its range in the use of fuels with varying characteristics, behaviour under varying loads, etc., and the splendid results obtained influenced the firm strongly in its determination to enter the marine field.

One of the most interesting features of the Dow plant is the splendidly equipped foundry. This branch of the works is fitted with two large cupolas, core ovens, etc., and there are also two Schwartz furnaces of 1000 and 3000 pounds capacity respectively for aluminum and bronze casting work. The foundry is one of the largest and best equipped founding plants on the Pacific Coast. The overhead equipment in the foundry consists of one 10-ton travelling electric crane of the Shaw type and one of similar power which was built and installed by the works.

The pattern shop is well equipped with wood working machines and is a roomy, well arranged structure and well lighted. A large machine shop completes the main group of buildings. This shop is modern in every respect, the central bay being served by a ten ton travelling electric crane while numerous jib cranes facilitate the handling of work about the individual tools. The machine shop is well equipped with special tools and jigs for Diesel engine work.

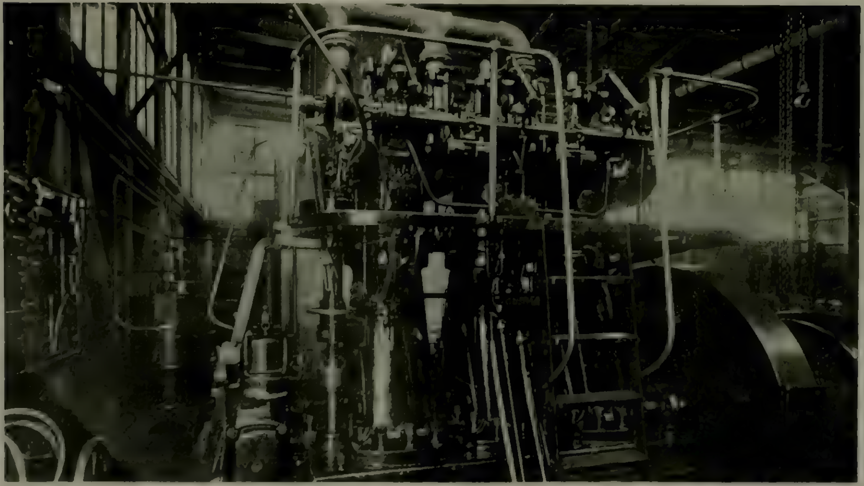


Schwart brass-melting furnaces in operation at the Dow plant in Alameda, Cal.

The office building contains a large, well lighted drafting room and the general offices of the concern, both business and technical. A competent staff has been built up and the present personnel of the management is in every way worthy of the long and honorable career of the Dow firm.

View in the foundry of the Dow plant.

View showing the main section of the machine-shop at the big Alameda plant.



Dow 160-horsepower, 3-cylinder Diesel engine, operating at the plant and furnishing electric current for the shops.

Freight Report

By Page Brothers

July 16, 1917.

OUR last circular was dated the 20th of May, and freights continue to advance. No grain is being shipped from Portland or Puget Sound, excepting what has been bought by the British Admiralty, and for which they supply their own steamers. Several of the steamers bought and building for the Cunard Line, or War Line, have been loading grain lately for U. K.

From San Francisco, the "Bessa," which was practically cancelled, was after all loaded with a part cargo of barley for Scandinavia, and she finished loading at New Orleans.

In our last circular, time charters were practically 47/6 on the deadweight for steamers of about 7,500 to 8,800 deadweight, for three rounds, delivery and redelivery this coast, to the Orient. Since then, the Norwegian steamer "Thordis" was chartered by Waterhouse & Co., Seattle, for one round to the Orient at 62/6 on the deadweight, and Matsuda & Co. chartered the "Frances Skinner," formerly "Sesostris," also for one round, at $15.00 on the deadweight. Mitsui & Co., Seattle, chartered the "Stolt Nielsen" at 50/- for three rounds, and G. W. McNear, Inc., chartered steamer "George Washington" to Manila and return on a reported lump sum of $450,000 for the round. The Norwegian steamer "Volund" was chartered by H. F. Ostrander for one round to Japan at $120,000, or if to Manila and return, $150,000 lump sum. Charterers paying for all port charges, stevedoring, etc. Owners paying for fuel. Mitsui & Co., Seattle, also chartered "Dicto," the new 6200 tonner building here at the Union Iron Works and now practically ready for sea, for three rounds to the Orient at 55/-. However, there is trouble, at present, both on the Norwegian steamer "Stolt Nielsen" and Norwegian steamer "Dicto," as the British Admiralty has objected to the charters. We forgot to mention above, that when these steamers were chartered, one of the conditions was that the charterers had to arrange for the Norwegian flag and to get the approval of the British Admiralty, so that at the moment it is not known what the outcome will be. Messrs. Mitsui & Co. of Seattle are reported to have bought two of Skinner & Eddy's new steamers, 8800 tons dead weight, on private terms, but here again there is a grave uncertainty as to whether they will get delivery, since Mr. Goethals, of the United States Shipping Board, has practically said the United States Government will take every ship now being built on this coast.

Some of the steamers of the Java Pacific Line, formerly intended to go from Java to Holland, have been diverted to return to Java, and being close at hand, were obliged to go North to fill up with lumber to Shanghai, Hong Kong and Japan, the rates being $25 per thousand feet, free of commission, which is the same rate of freight at which other liners have been taking lumber for the Orient. The position on freights to and from the Orient is the exact reverse of what it was here last autumn. Then, freights of $30 to $50 per ton were being paid from this side of the Orient, and $10 to $15 for return cargo to this coast. Lately, steamers from this side have accepted as low as $10, $11 and $12 per ton to the Orient, but have received anywhere from $35 to $50 per ton to carry merchandise from the Orient to this port and to Seattle.

Lately, there has been a dearth of Japanese tonnage apparently, and on cabling owners of steamers in Japan for offers of their steamers, we have found that their ideas were even higher than anything mentioned in the above circular, showing that they must be getting extraordinary freights between Oriental ports, etc.

A good many vessels have changed hands lately. The Rolph Navigation & Coal Co. bought the steel tug "Relief" for $65,000, also the tug "Samson," reported at about the same price. These tugs will be used in the business of towing the barges belonging to this coal concern. The United States Government bought steamer "Columbia" from the Globe Mills at a price reported to be $630,000. A New Orleans firm bought the schooner "Ariel" at $65,000. Messrs. Crowley & Mahony bought steamers "George W. Elder," "Breakwater" and the "Kilburn" at price said to be $450,000 for the three. Mr. Fred Linderman bought back the steam schooner "Mary Olson" at $195,000, originally sold to Eastern parties. He has also bought the steam schooner "Saginaw" on private terms. The Robert Dollar Co. bought motorboat "May" from A. O. Andersen & Co. at $300,000. The Inter-Island Steam Navigation Co. bought the steam schooner "Doris" at $175,000. The schooners "Wm. H. Smith" and "Eric" were bought by an Australian concern at $70,000 and $65,000 respectively. The schooner "Columbia" was sold at $65,000 and the "Alpena" at $95,000. The "Alpena" has made a remarkable record for sail schooners, and has been the most consistent dividend payer of any vessel owned on the Coast, which speaks well for her manager, Mr. J. H. Baxter.

Lumber freights to the west coast have run steadily from $35 per thousand as high as $40 in one or two cases.

Australian lumber freights have been steady at 130/- to 135/- Sydney, 145/- to 150/- Melbourne or Adelaide.

No vessels have been chartered for lumber for U. K.

For Africa, Comyn, Mackall & Co. have sold two cargoes by their vessels, the "E. R. West" and "Watson R. West," the freight rates being 260/- per thousand. Hind, Rolph & Co. are said to have chartered motorboat Hull No. 4, belonging to H. F. Ostrander, to a direct port in Africa at $60 per thousand, with very favorable conditions to the owners. The "Flying Cloud," ex-German ship "Ottawa," has been chartered for case oil, etc., etc., to Sydney and Melbourne by G. W. McNear, on a reported basis of $100,000 lump sum, with an additional sum if two ports used. They have also chartered the "Falketind" at a reported rate of about $210,000 for the round trip to Australia.

The "City of Panama" was chartered by the Union S. S. Line with case oil, etc., to Sydney or Wellington on the basis of $1.25 per case from

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DONOHOE'S STEEL
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Patrick J. Donohoe
NAVAL ARCHITECT

PACIFIC BLOCK
SEATTLE, WASH.

YARDS AT
EVERETT, WASH.

this port, also "City of Sydney," on private terms, to Sydney and Melbourne. J. J. Moore & Co. have chartered the "John & Winthrop" at $1.25 per case to Auckland.

At the close, business is difficult because of the many new rules and regulations and embargoes which have been forced upon the United States on account of their entrance into the war.

Marine Insurance Notes

NOW that the embargo on exports is an accomplished fact American marine insurance underwriters are casting reflective eyes over the premium income of the past months and are wondering what the next few months will show. That the result, for a time at least, will be a serious falling off in the volume of business is certain, but to what extent and for how long it will last it is unsafe to venture even a guess. The Allies and our own men at the front must, of course, be provided with food, with munitions, and many things necessary to sustain life, to carry on the war and to ameliorate conditions, and the prosecution and completion of the present ship-building plans of the United States indicate an enormous export trade. This must be protected by both marine and war risk insurance and this of itself may tax the resources of the marine insurance markets.

But, per contra, the strict supervision and lopping off of exports to neutral nations may, to some extent, nullify this. It is well established that the Central Powers have been receiving necessaries of all kinds indirectly from the United States through neutral nations. As long as we, ourselves, were neutral we could not take exceptions, for to a neutral country all markets are equal with no favorites, but now, being at war with Germany, it is necessary for our own safety to see to it that no aid is given to our enemy through neutral channels, and of necessity there must be a re-adjustment of business. What the extent of this aid has been no one knows but with the curtailment of such exports the marine premium ledger will be affected and this, of itself, will show quite conclusively the extent of the aid which our enemy has been drawing from us through neutral agencies.

Among those who are doing business on the Pacific Coast there is much speculation as to what extent the Government will commandeer the American steamers engaged in Pacific ocean trade. For trans-Pacific trade there are far too few steamers flying the American flag and yet the volume of business for the American underwriters is fairly large. The Japanese steamship lines are expanding and should there be a wholesale commandeering of American bottoms, they must be depended on more and more to attend to the trade across the Pacific. These lines seem inclined to favor merchants of their own nationality so far as space is concerned and these merchants, both exporters and importers, will naturally seek the insurance protection of the Japanese Insurance Companies of which there are several of large resources and which are branching out for business. The combined efforts of these agencies, the favoring of Japanese merchants by the Japanese trans-Pacific lines, the favoring of the Japanese underwriters by these merchants, and the increasing activity of the Japanese insurance companies cannot help but have a decidedly adverse effect on the premium income of the American marine underwriters.

Another source of anxious speculation is the fate of steamers plying on the coast to ports between Puget Sound and San Diego. Many of these steamers are suitable for Government requirements and may be requisitioned, but if so what will be the effect on trade in general and how will Alaska be served? Alaska, a most important territory of the United States and one which is a large factor in adding to the sinews of war in the way of food stuffs, gold, and other if baser metals, must have steamer service, for sailing craft are not suitable for a large part of that trade. A withdrawal of means of steam communication between ports on this western coast of the United States and with Alaska will result to the detriment of business and in extraordinary hardships to individuals. A minor effect, minor under the circumstances, will be a large diminution in the income of marine insurance companies without which income losses cannot be paid.

Now a glance at the other, the loss, side of the ledger. Since the war started freights have reached such an altitude that many bottoms, which have been used as scows or even entirely abandoned have been pressed into service. Most of these have been overhauled thoroughly and put in such condition as to be able successfully to operate and the losses on these old crafts have been, comparatively speaking, very small. At this writing there is dissension in the United States Shipping Board regarding the construction of ships. The first object of the Board is to furnish a fleet sufficiently large to minimize the underseas warfare carried on by the Germans and the second, and secondary at present, is to provide a large nucleus for an American merchant marine after hostilities have ceased. To attain the first objective it is necessary that the ships shall be constructed with care and of materials which will withstand the buffeting of the seas and winds for of what avail is it that a ship, or a number of them, shall escape the sub-marine only to find on reaching destination that the cargo carried, and on which might depend successful conclusion of a battle, had become worthless by reason of too hasty construction or with materials which are not quite suitable, but which may or may not answer?

That the Government must have ships quickly is certain and to get them many must be commandeered is also certain and this will result in placing into commission "anything that will float" and debits in the ledger must increase and the marine underwriter will have to face a diminishing premium income and an increasing loss ratio.

However these are war measures and must go through and it is not likely that any Insurance

FIREMAN'S FUND
Insures Hulls, Cargoes,
HEAD OFFICE: CALIFORNIA AND SANSOME

JOSEPH HADLEY, European Agent
3 LOTHBURY, E. C.
LONDON

G. KIRKHAM SMITH, Special Agent
407 LEWIS BUILDING
PORTLAND, ORE.

FRANK G. TAYLOR, GENERAL AGENT FOR WASHINGTON, OREGON, ALASKA

Company will inquire too closely into the actual cause of the loss or damage, at the same time it is absolutely necessary to provide against the entire wiping out of the resources for the failure of any company to meet losses would have very disastrous results.

Therefore the marine underwriters doing business on this coast are debating with themselves what the result of the war measures will be.

WAR-RISK DECISION

AN interesting decision has been recently handed down in England in connection with war risk insurance. In a suit against a Protection and Indemnity Club for a claim for particular average.

The Steamer "Fulgens" was sunk off the coast by a German submarine and the Steamer "Sherwood," which was in the same path and came along considerable later struck the wreck and was badly damaged. It was contended by the plaintiff that the sinking of the "F" was an act of war and that the striking of the "S" against the wreck was a direct consequence, there not having been time to buoy the wreck, and that the cost of repairing the damage was a claim against the war risk policy issued by the defendant.

The court, in giving opinion, said that had the "F" been sunk in a narrow channel or at the entrance to a port solely for the purpose of destroying or injuring other vessels attempting to use the channel or to enter the port then any damage sustained would be covered by the war risk policy but as it seemed to be the object of the submarine to sink the "E" only then any craft following in her path and accidentally running into her was taking only the usual chances of navigation. The court stated that if a timber ship was torpedoed and abandoned as a derelict and was subsequently run into by another vessel the damage to the colliding vessel must be considered as due to a peril of the sea and would not be recoverable under a war risk policy. The court further said:

"The casualty was due to the fact that by a singular chance the "S" happened to pass over the very spot where the "F" had been sunk. Vessels navigating the seas must, in the matter of wrecks take the seas as they find them, and if they run upon wrecks, the reason why they happen to be there is immaterial, unless they are actually placed there as an act of hostility for the purpose of damaging passing vesseels."

MARINE MISHAPS

Up to date, July 20th, marine mishaps on the coast have been of minor importance and so far as the strictly coastwise business is concerned marine underwriters will not be compelled to dig very deep in order to satisfy the claims.

"MARGARET" M/S. From Portland June 19th for China with a cargo of lumber went ashore on June 20th in the Columbia River opposite Astoria. She was later floated and proceeded on her voyage but on June 24th was reported as being on fire about 100 miles off Astoria. She was picked up by the tank steamer "Atlas" and towed to Astoria where the fire was extinguished. Damage estimated at about $20,000.

"NORTHLAND"—Str. This steamer, which was sunk at Kake, Alaska, on June 25th, 1916, has been raised from a depth of about 110 feet and on June 20th, 1917, was taken to Petersburg, Alaska. Several offers have been made for her purchase as she stands but up to this writing none has been accepted. Contract price for her raising and delivery at Seattle was $30,000. It is reported that some of the offers made for her will absorb the salvage and leave a very handsome profit for the owners.

"F. A. KILBURN"—Str. From Portland for San Francisco via Eureka broke the high pressure cylinder head on July 13th and was towed to San Francisco by the Str. "Atlas." Value of Steamer and cargo about $125,000, insured locally.

"JEFFERSON"—Str. From Seattle June 25th for southeastern Alaska broke her crank shaft during the voyage but succeeded in reaching Ketchikan. Cargo and passengers were transferred to another steamer and the Jefferson has been towed back to Seattle for repairs.

"SINALOA"—Nor. Str. Ashore at Cape Blanco. Latest reports from this steamer indicate that she will be floated before July 25th.

INSURANCE COMPANY
Freights and Disbursements
STREETS, SAN FRANCISCO, CALIFORNIA

W. H. WOODRUFF, Special Agent
220 BYRNE BUILDING
LOS ANGELES, CAL.

O. G. ORR & CO., Managers
ATLANTIC MARINE DEPARTMENT
37-43 WALL STREET NEW YORK

AND BRITISH COLUMBIA, 264 COLMAN BUILDING, SEATTLE, WASHINGTON

A Revolutionary Wood Working Tool

ONE result of the great revival of wooden shipbuilding and the consequent scarcity of ship carpenters has been the keen interest that has been aroused among makers of woodworking machinery in getting out machines for handling ship timbers that, not so very long ago, were all shaped by hand. The hand shaping of ceiling and planking strakes necessitated the use of experienced ship carpenters for practically all the work in a shipyard. Naturally the sudden return to the wooden ship created a demand for high-class ship carpenters that rapidly ran ahead of the available supply. House and mill carpenters can be trained in a short while to undertake some of the work formerly only entrusted to ship carpenters, but a certain number of experienced ship men are required in every wooden shipbuilding establishment. With a view to doing mechanically work hitherto performed by master carpenters, several very ingenious woodworking machines have been perfected of late years, and of these, perhaps, none shows a more radical departure in method or a greater saving in skilled labor—in fact, both in skilled and unskilled labor—than the planing, beveling and edging machine recently perfected by the Stetson-Ross Machine Works, Seattle, Washington.

The possibilities of this machine have appealed strongly to the shipbuilders of the U. S. and Canada, where it is found in nearly every yard of any size. The work of gettin gout planking and ceiling strakes is accomplished at a great saving in skilled labor, to say nothing of cost, and a large number of ship carpenters are relieved of this work and can be utilized on other tasks, thus speeding up production.

The work of this shipyard tool is best explained by a study of the accompanying pictures, which were taken under actual working conditions at a well known Seattle wooden shipyard.

Figure 1 shows the 20-inch beveling side head mounted in a heavy yoke and the countershaft with automatic tightener. The beveling side head is shown tilted to thirty degrees to the right with the adjustable guiding collar placed about sixteen inches from the bottom for beveling 16-inch timbers. This collar may be adjusted for any size timber up to nineteen inches. The bevel indicator is placed directly in front of the bevel turners' position as he stands when operating the beveling side head.

The bevels on most ship timbers do not exceed ten degrees, and very few timbers require more than fifteen degrees. This machine, however, has a range of thirty degrees to the right and twenty to the left, giving a very wide range of beveling work.

Figure 2 pictures the 48-inch top beveling head mounted in a heavy yoke and locked in a horizontal position. This head may be tilted fifteen degrees either way, as shown in Figure 3. It is also equipped with indicators to show the exact thickness and the exact angle at which it is set. It can be securely locked at any angle, or the angle may be changed as required while the timber is passing through the machine. This head is found entirely suitable for such work as hatch coamings, etc. The cutter head is square, slotted four sides, and is regularly fitted with one pair of straight knives. On the opposite side of this beveling head, special knives may be fitted for cutting such work as the bead on clamping strips.

A side view of a timber 14 by 14 inches by 80 feet in length is shown resting on the carriage and ready to pass through the machine in Figure 4.

The possibility of combining beveling, reverse beveling and curvature to a timber is well shown in figures 5 and 6. The first picture shows the start of the cut with a bevel of eleven degrees to the left, the angle continually changing until the finished result was obtained as shown in Figure 6. This curved cut starts with a bevel of eleven degrees to the left and finishes with a bevel of eleven degrees to the right.

In Figure 7 are shown eleven knees surfaced on each side by the Stetson-Ross machine. These eleven knees were loaded on the carriage, surfaced on one side, turned over and surfaced on the other side, and this entire operation occupied only fifteen minutes.

In Figure 8 we have an iron-bark rudder stock after sixteen cuts have been completed, the lower part beveled two ways and the sides surfaced. The last picture shows this same rudder stock

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FRANK A. BOND, President

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PACIFIC COAST SALES MANAGERS

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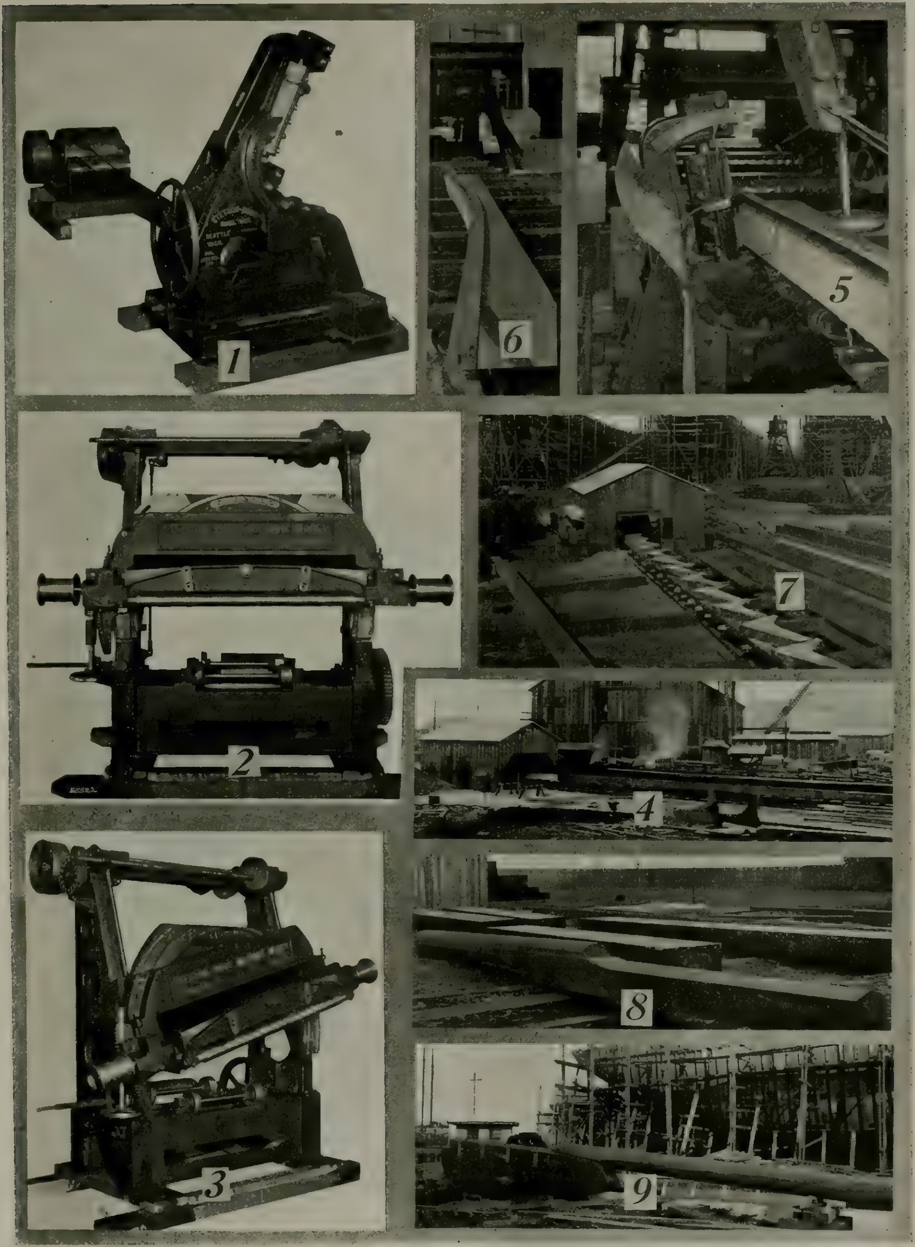


The Stetson-Ross planing, beveling and edging machine and some work being performed by this machine in a Seattle shipyard. For a description of these pictures, see text.

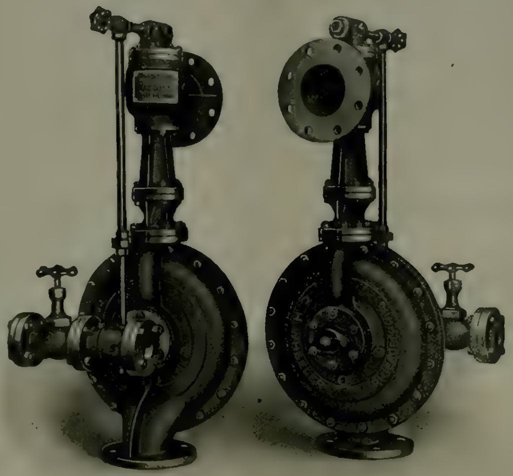
after leaving the machine. The work is practically finished and but little time with hand tools is required.

The accurate work performed by this machine and the rigidity and strength of its alignment make it one of the most notable innovations in woodworking machinery for shipyard use that has appeared in engineering circles for many years. Its twofold value, first as a reducer of cost and labor, and, even more important in these times of abnormal demands for wooden tonnage, the releasing of a goodly proportion of the ship carpenters from the long and tedious work of shaping timbers by hand, has assured this machine a ready welcome in most of our overtaxed shipbuilding establishments.

-R-A-D-O-J-E-T-

AIR PUMP

(PATENTS PENDING)



THE **RADOJET AIR PUMP** PRODUCES THE **HIGHEST VACUUM** WITH THE FOLLOWING ADVANTAGES.

- EXTREME SIMPLICITY
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- MINIMUM WEIGHT
- NO MOVING PARTS
- NOISELESS OPERATION
- NO FOUNDATIONS
- LOW STEAM CONSUMPTION
- QUICK STARTING

C. H. WHEELER MFG. CO.

MARINE DEPARTMENT
PHILADELPHIA, PA.

DESIGNERS AND BUILDERS OF CONDENSERS AND CONDENSER AUXILIARIES

THE TEAK SUPPLY

Teak has always been considered the wood par excellence in the construction of ships. Teak deck margins and teak rails are so common as to be considered almost a necessity, and the character of this eastern wood is such that the amount of it entering the wood work on steel vessels is generally only limited by the owners' ability or willingness to pay the cost.

The reasons for the high price that teak has brought as compared to other much used hardwoods is due to several distinct causes. In Siam, where large concessions have been made in the teak forests, the law requires the concession owner to plant a teak tree for every one he destroys. Again, the teakwood is seasoned on the stump; that is, the tree is ringed and the dead trunk allowed to stand through several seasons till it is thoroughly dry and in the best possible condition. This seasoning serves the double purpose of insuring the purchaser of the very finest wood and at the same time enables the cut logs to be transported down stream, as a green teak log would not float. Another cause of the high price of teak lies in the fact that the great shipbuilding centers of the world are all far removed from the source of supply, and freight, especially during the past two years, has often exceeded the price of the wood f.o.b. in Bangkok. The effect of high freight rates upon the cost of this wood is accentuated by the usual conditions surrounding its purchase. Shipbuilders usually buy the heavy squares from dealers and have these cut into the required sizes either at the mill of the dealer or at their own sawmill. This entails a large amount of waste, and the freight has been collected not alone on the timber used but also on this waste material. Again, a shipbuilder may fill his requirements from the stocks of a dealer at some distance from his plant and another rail or water tariff is added to what has already been paid for the trans-ocean shipment.

Since the teak requirements for any ship can be very closely approximated as soon as the plans for the vessel have been completed, a far more economical way of purchasing would be to order the timbers cut to size in the mills in Siam or wherever the material was ordered from. It is obvious that by choosing the logs best adapted to the size of timbers ordered, that the mills at the point of production could effect a considerable saving in the amount of wasted wood and at the same time the transportation costs to this country would be materially lessened. By making shipment from the mills direct to the point of consumption, a further short-haul freight charge would be obviated. Under these circumstances, and owing to the fact that the teak requirements for a ship are known far in advance of the time the wood must enter into the structure of the vessel, it is surprising that shipyards do not place orders for their specific requirements directly with the producers rather than buying the teak squares as many of them do.

The illustrations herewith were secured on the concessions held in Siam by the East Asiatic Company, the well known firm that has been operating large motorships with such signal success in the Far Eastern trade.

A boom of teak logs waiting to be floated down a Siamese river to the sawmills.

A teak sawmill in Siam. The East Asiatic Company operates several mills in this country and holds large forest concessions from the Government.

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ENGINEERS
AND
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Losses Paid Since Organization Over $183,000,000.

Exceptional Facilities for Writing Practically All Forms of Property Insurance

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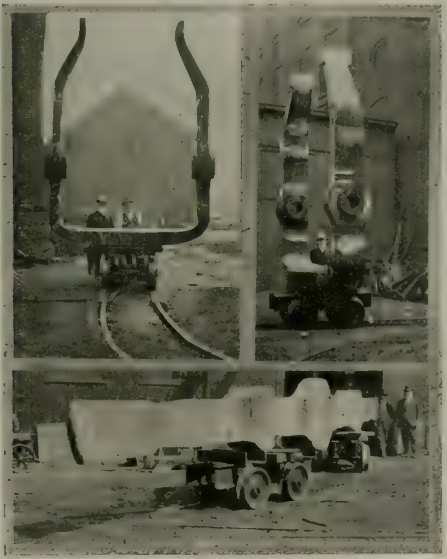
PACIFIC COAST DEPARTMENT:

J. C. JOHNSTON,
324 Sansome Street,
SAN FRANCISCO, CAL.

J. B. LEVISON,
California & Sansome Sts.,
SAN FRANCISCO, CAL.

This concern is a very extensive holder of Siamese forest land concessions as well as operating great plantations of various sorts. A large herd of elephants is maintained to handle the heavy teak logs about the mills and into and out of the rivers down which the felled timber is conveyed. Strict government supervision in addition to the firm's careful selection of trees, and ample allowance of time for thorough seasoning on the stump, has resulted in a uniformly high character of output from these forests. Another view shows a thoroughly modern and up-to-date sawmill, where batteries of band saws cut the teak to desired dimensions. The teak industry has always been one of Siam's leading sources of income and prosperity, and, owing to severe and strictly enforced forestry laws, this—to Americans at least—little known country seems destined to go for hundreeds of years as the world's principal source of this most valuable of hardwoods.



The forged billet (lower) and the finished yoke forging (upper) for unloading machinery of a large Great Lakes stone boat.

AN UNUSUAL YOKE FORGING

In connection with the equipping of the large stone-carrying, self-unloading steamer "W. F. White," which was built at the Lorain yard of the American Shipbuilding Company, an unusual yoke forging had to be made. This forging is shown forged only in the lower picture, being 48 inches wide, 10½ inches thick in the center, and a little over 42 feet long, weighing 24,000 pounds. The upper views show the finished forging bent to shape and ready to ship. The extreme width is 9 feet 11 inches, and the extreme height is 13 feet 2 inches, and the finished weight 19,500 pounds. The unloading mechanism into which this large yoke forging enters is designed to unload stone at the rate of 2000 tons per hour. The yoke carries the boom, the hopper, and the machinery carrying the main carrier belt, which is driven by an 11-inch shaft extending upright through the center hole. The boom is carried on the milled trunions and will deliver the cargo of the steamer to any dock 150 feet from the center line of the ship. The forging was made by the DeLaney Forge & Iron Co., of Buffalo, New York.

Five steam fishing boats built in Maine for the Seaboard Fisheries Company of New York, were sold to the British government for $500,000. A contract for five more was placed with the Manitowoc Shipbuilding Company of Manitowoc, Wis., and the three which have been completed and delivered to salt water have been taken over by the British government from the Seaboard company.

JOHN GRIFFIN FOR SUPERVISOR

John Griffin, Night Manager of the St. Francis Hotel, who will be the Hotel Men's candidate for Supervisor at the coming election next November, recently was called upon to address the Oregon State Hotel Men's Association, in convention assembled at the city of Portland.

Candidate Griffin, whose activities before the Board of Supervisors were in a large measure responsible for the regulation of the jitney nuisance on Market street, and who was less successful in his efforts on behalf of the hotel men's organization to quell the boisterous soliciting of taxi vendors and hotel runners at the Ferry Building and other depots, in speaking to the Oregon hotel men did not beggar the question nor mince his words. He hit clean and straight from the shoulder. He told them of the utter futility of any man or organization attempting to carry water on both shoulders. Candidate Griffin said in part: "Your city government is no better than what you make it. The man or organization that wants to do right should never be in doubt. Hotels are a quasi-public institution; the men interested in such institutions are the last that should attempt to shirk their civic responsibilities."

Mr. Griffin resigned the presidency of the Greeters and Hotel Men's organization to enter the fight for Supervisor. His many experiences in appearing before the Board of Supervisors in matters affecting the hotel industry and on other civic questions will stand him in good stead when he takes his seat on the new Board of Supervisors, as his many friends feel confident he will.

Mr. Griffin has been in the employ of the St. Francis Hotel for the last twelve years. Prior to coming to the St. Francis he was in the employ of James Woods at the famous Waldorf-Astoria in New York.

Announcement was made on June 28th by the International Mercantile Marine Company that Captain John Clark Jamison, for many years the Commodore of the American Line fleet, has retired from active duty, having considerably passed the service age-limit set by the Company. The officials of the American Line, in common with scores of thousands who have traveled with Captain Jamison, regret exceedingly the loss of his efficient and valued service. Captain Jamison joined the American Line in January, 1876, as second officer of the S.S. "Pennsylvania," rising rapidly to a command in 1880. After Congressional action, in 1892, which transferred the British-built steamers "City of New York" and "City of Paris" to American registry, Captain Jamison was in command on the historic occasion when President Harrison raised the Stars and Stripes on the "New York" in New York Harbor, February 22, 1893. Since that time Captain Jamison has been continuously in command of one of the American Line's fast mail steamers, his latest service being aboard the "St. Louis." Captain Jamison was born in Brooklyn, N. Y., where he has resided for many years.

Glide Air Hose Is Goodyear Hose

UNDOUBTEDLY the tremendous volume of Glide Air Hose deliveries in recent weeks is partially accounted for by the fact that our branches can make such deliveries immediately.

The construction facilities of shipyards have been enlarged with unprecedented speed and air hose as well as other equipment is wanted promptly by all.

So tremendous has been the expansion in many yards that the customary demand for quality has sometimes been subordinated to mere speed in delivery.

Glide Air Hose is Goodyear Hose.

The heart of it, the inner tube, is compounded to resist strains and the oil vapor from compressors—compounded by the same masters who have contributed so much to the outstanding merits of Goodyear Tires and Goodyear Conveyor Belts.

The seamless cotton jacket, between the inner tube and the outer cover, is a product of the same careful research in the weaving of fabric for mechanical equipment which has produced the special weave duck of Blue Streak Belts with its enormous strength and amazing adaptability to pulley conditions.

This specially woven body is effectively designed to minimize the lengthening effect of the air pressures within the hose, effects which in inferior hose strain body and inner tube so strenuously as to shorten their life.

The tough and durable outer cover is another achievement in compounding, an achievement made possible by the same patient endeavor which produced the virtues which have won for the Goodyear All-Weather tire treads their well-merited reputation.

These three parts, inner tube, seamless body and outer cover are *moulded* into a wear-challenging unit *that will not kink*—Goodyear Glide Air Hose.

As in every Goodyear product, no factor in efficient construction and durable materials has been overlooked.

In consequence Gilde Air Hose satisfies the insistent demands of piecework labor for air hose giving continous service.

And it keeps down overhead costs.

The Goodyear Tire & Rubber Co., Akron, Ohio

Goodyear Porthole Rubber can be cut to any size desired. It is a quick and durable compound designed to give a maximum of service on portholes and hatches.

Goodyearite, the high-pressure superheat packing, is made of long fibered asbestos compacted with a minimum of binder, especially designed as a standard packing for marine use. Our branches carry stocks for immediate delivery.

GOODYEAR
AKRON

GAS-ENGINE MAN JOINS AVIATION CORPS

In these days of stern military necessity, many an enlisted man is sacrificing his home and business life without a murmur and marching away to France to do his share of the fighting which his country needs him to do, but when a man voluntarily and through no military requirement passes up vital business interests because he is peculiarily fitted to aid his country and believes that his country should stand before all else, then we have a display of patriotism that makes us realize that the same red blood courses through American veins as in days of old.

Examples of this sort we are hearing of all over the country, and one of the most conspicuous of these cases is that of J. H. Clayton, the secretary of the Standard Gas Engine Co. of Oakland, Cal. Mr. Clayton became an officer of the Standard Gas Engine Co. in January, 1917, and in addition to being secretary was also direct assistant to President Geo. W. Emmons in the management of the big manufacturing institution. Young, active, capable, and enthusiastic, his opportunities with the company were great and his career a promising one, and yet he did not hesitate to sacrifice this immediate future when America sent out the call for her sons to come to arms in her defense. Clayton has had much experience in aviation, and realizing the need of the country for trained men in this work, he immediately and without hesitation offered his services and was accepted. He took this step and his associates in the company encouraged his taking it despite the fact that the business of the Standard Gas Engine Co. for the present year is greater than ever before in its history, and that the need of Clayton's experience and knowledge was very keenly felt at the home office.

Of course, the gap left by Clayton has been filled, and the business of turning out "Frisco Standard" engines for the fishing and work-boat fleets of the world is going on apace, and Clayton will soon be on his way to France to do his bit, secure in the knowledge that the place which he left is waiting for him when he comes back and that his associates in the company are each and everyone of them behind him in the patriotic effort he will make for his country.

NATIONAL CHAIN IN DEMAND

The National Chain Company finds itself in these days of overflowing orders in a very favorable condition as far as deliveries are concerned. This is largely due to the fact that the Company is a new one and, while organized by experienced men, many of whom formerly held executive positions in the old Standard Chain Company, and equipped with the most modern machinery, their order books have not had time to be filled to overflowing. This fact is allowing this concern to still make reasonable deliveries on chain, although the duration of this condition is entirely problematical. National chain is being handled on the Pacific Coast by the A. C. Rulofson Company, Western Sales Managers for the concern, with offices in the Monadnock Building, San Francisco.

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Cylinders 13½" x 20¾" x 26½" x 26½" x 13½" stroke, 2000 H. P. at 400 R. P. M.
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Write or call for particulars
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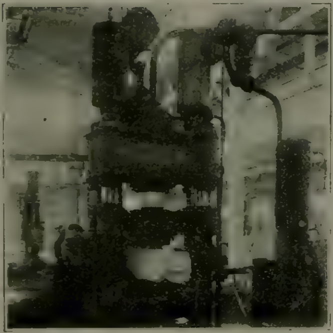

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CHECKING FUEL WASTAGE

No phase of the industrial situation on the Pacific Coast is receiving more attention than the continued rise in the price of crude oil. The cause for this rise is ascribed to various reasons, but after all is said on the subject, the problem sifts down to a case of supply and demand. As crude oil is the chief source of motive power for water transportation over a large portion of the Pacific Ocean, and also on a goodly portion of the Pacific Coast railroads, its cost vitally affects all common carriers as well as all industries, and the injunction to engineers to maintain their fuel-oil consumption at as low a level as possible is heard on every hand. The question of what is going up the funnel with the flue gases was never considered of more importance than it is today. At the present price of oil, a remarkably low percentage of difference in efficiency will make itself strongly felt in the cost of producing power.

The most reliable method of ascertaining the completeness of combustion in boiler furnaces is, of course, a complete analysis of the flue gases. On shipboard, however, such a procedure would be impracticable, owing to the time consumed and the apparatus and material required for such work. Fortunately, the presence of carbon dioxide in flue gases serves as a basis for arriving at a very close approximation of the completeness or incompleteness of combustion. The proper control of the air supply to the furnace means the saving of fuel, and the higher the carbon dioxide in the flue gases the less excess air there is. It follows that if the carbon dioxide content of the flue gases can be readily and easily obtained at any time, the fireroom force will keep their burners under the right working conditions to secure economy.

Oil fuel is picked up at various ports, and naturally no two supplies will possess exactly the same physical or chemical properties. This means that when burners are set to burn one supply of oil economically, they may burn the next oil supply very wastefully. Under these conditions, any instrument that will enable an engineer to set his burners correctly for economical results and do this without waste of time cannot help but result in material fuel savings.

Among the instruments for determining the presence of CO^2 in flue gases or elsewhere, there is perhaps none so simple and inexpensive as the Dwight instrument. This instrument, as indicated in the accompanying illustration, is less than 12 inches in height, and so simple and easily worked that the man in charge of a fireroom is always willing to test a flue-gas sample whenever the slightest suspicion is aroused that the combustion conditions may be improved.

Potassium hydroxide is mixed with a little water, making about 10½ ounces in all. An ounce of kerosene oil is added to the solution, and the mixture is poured into the cylinder of the instrument. A sample of flue gas is then drawn from the last pass of a water-tube boiler, or from the connection between the boiler and the breeching in a fire-tube boiler, and passed through the chamber until all air in the cylinder of the Dwight instrument has been dispelled. When both cocks on the instrument are closed, we then have a charge of flue gas at atmospheric pressure. The potassium hydroxide mixture in the bottom of the cylinder is protected by the film formed by the kerosene oil which has been put in the instrument with it. By shaking the instrument, this oil seal is broken and the potassium hydroxide absorbs the CO^2. This creates a partial vacuum in the cylinder which is indicated on the vacuum gauge mounted on top of the instrument. This gauge is calibrated to give the percentage of carbon dioxide.

The ease with which a close approximation of the carbon dioxide content of flue gases can be obtained with this apparatus, and its reliability, fool-proofness, and cheapness have made the Dwight instrument meet with ready favor from marine engineers. Although only introduced on this Coast a short while ago, a number of installations have already been made. Results were obtained on the Pacific Mail steamer "Ecuador" that has led to the other vessels of the fleet being fitted with these instruments. The "Geo. H. Henry" of the Pan-American Petroleum fleet has one on board, the Spring Valley Water Company, the Union Iron Works, the Associated, Standard, and Union Oil companies are all using these simple aids to fireroom efficienecy.

The Dwight CO^2 indicator is being handled on the Pacific Coast by Stephenson & Nichols, Inc., of 1070 Folsom Street, San Francisco.

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1—18″—32″—54″x42″ Stroke, Triple Expansion Marine Engine complete with throttle valve and jet condenser. Suitable for 165 lbs. gauge pressure. Can be quickly put in first-class condition in our shops. If desired will furnish surface condenser.
1—8x10 Globe Windlass, suitable for 1¾″ stud link chain. Arranged for capstan drive. In good condition.
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Van Arsdale-Harris Lumber Company
FIFTH AND BRANNAN STREETS SAN FRANCISCO, CALIFORNIA
White Cedar, Spruce or Sugar Pine Template Lumber
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Redwood Pattern Stock
In All Grades and Thicknesses
White Cedar
For Mould Loft Flooring
Long Clear Fir Timbers • Vertical Grain Fir Decking
Sugar Pine • California White Pine

NEW PLANT'S FIRST BIG JOB

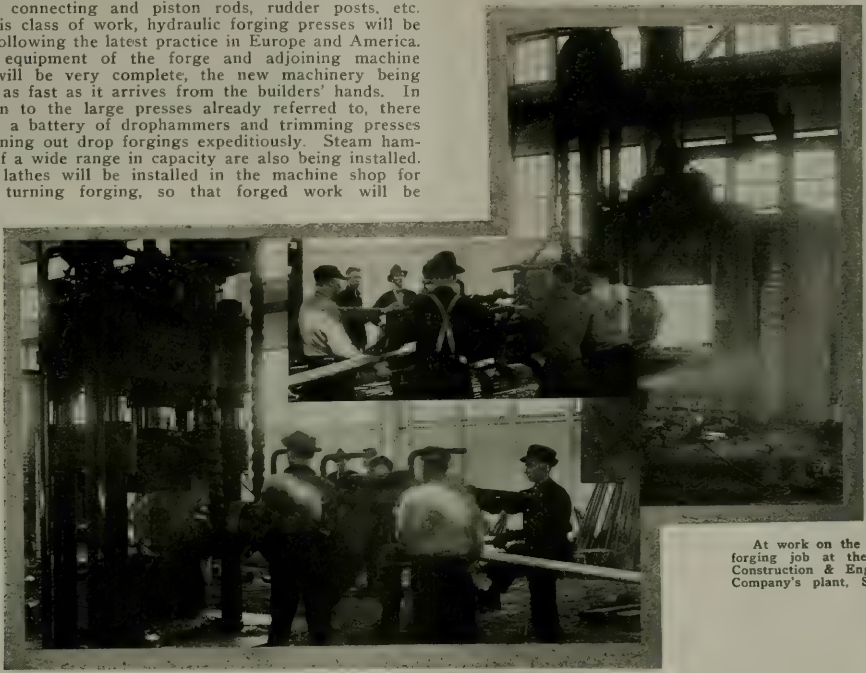
The accompanying illustrations show the first large forging turned out at the new plant of the Pacific Construction & Engineering Company, a Seattle concern which is completing its equipment of heavy forging machinery as fast as possible. The forging is for a crankshaft and is shown being removed from the furnace and also under a heavy hydraulic forging press.

This job marks the completion of an important advance in the mechanical engineering equipment of the Northwest, and the founders of the Pacific Construction & Engineering Company are being congratulated on the energy they have displayed in getting their important project under way.

In projecting their plant, this Seattle concern determined to equip the finest forge shop in the West, and all the equipment now in place, as well as hat still under order, is of the heaviest and most modern type. The firm will specialize in heavy work, both marine and stationary, such as heavy shafting, stern frames, rudder stocks, connecting and piston rods, rudder posts, etc. For this class of work, hydraulic forging presses will be used, following the latest practice in Europe and America.

The equipment of the forge and adjoining machine shop will be very complete, the new machinery being set up as fast as it arrives from the builders' hands. In addition to the large presses already referred to, there will be a battery of drophammers and trimming presses for turning out drop forgings expeditiously. Steam hammers of a wide range in capacity are also being installed. Large lathes will be installed in the machine shop for rough turning forging, so that forged work will be known to be sound before leaving the shop. These lathes will be motor driven. Oil-burning furnaces will be used to heat forgings and ingots, thus assuring even heating of material throughout. The latest type of oil-burning annealing furnaces are also being installed. The power plant will consist of a battery of oil-burning boilers housed in a commodious powerhouse.

The new forging concern, of which Robert C. Monteagle is president and general manager, and James Bingham general superintendent, is receiving the hearty support of the shipyard and engine builders of the Northwest, and a splendid success is predicted for this branch of the metal-working industry on the Pacific Coast.



At work on the first big forging job at the Pacific Construction & Engineering Company's plant, Seattle.

The rising cost of fuel and labor has quickened the demand for meritorious fuel and labor saving equipment in the marine field. The successful shipowners or operators know that greatly increased profits are realized through reductions in operating expense; for instance, the sale of mechanical soot blowers has reached a height that was hardly dreamed of. The Diamond Power Specialty Co., manufacturers of Diamond Soot Blowers, report that during the month of May over 262,000 horsepower of boilers were equipped with Diamond soot blowers. That company has recently published a book entitled "How Some Shipowners Have Increased Their Profits." The material for the book was gathered from the experiences of such well known shipowners, builders and operators as The Great Lakes Engineering Works, Newport News Shipbuilding & Drydock Co., Pittsburg Steamship Co., Coastwise Transportation Co., White Star Line, Ocean Freight Line, Central Railroad of New Jersey, Pickands Mather Co., Merchants and Miners Transportation Co., and hundreds of other users of the Diamond equipment. The book is printed in colors. The cover represents a shipping scene in New York Harbor. One of the most interesting chapters is entitled "A Little Course in Bookkeeping." This chapter shows by actual figures how much can be saved by the use of the mechanical soot-cleaning device installed on marine boilers in place of the old-stye hand hose method. The Diamond Power Specialty Co., Detroit, Mich., will gladly send a copy of this book to anyone who is responsible for the operating costs of marine boilers.

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"PERFECTION" Boiler, Ship and Structural
Made from Carnegie Steel
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Write for Prices and Monthly Stock Lists
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ELECTRIC
MOTORS
On Pacific Coast

ALL SIZES AND TYPES

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DRY DOCKS

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These are the most satisfactory SOFT WOODS the Shipbuilder can use and get the best results. *Send us a Trial Order and be convinced.*

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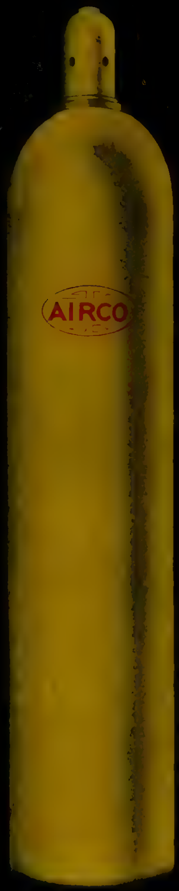
PACIFIC MARINE REVIEW

LAUNCHING OF THE "JUANA COSTA" AT THE [illegible] [illegible]

SEPTEMBER 1917



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PACIFIC MARINE REVIEW
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The Ship Manning Problem

THE conference called by Secretary of Labor Wilson at Washington for August 1st and 2nd resulted in a large and thoroughly representative gathering and in some straight-from-the-shoulder discussion. Especially interesting were the talks of Secretary of Commerce Redfield and Secretary of Labor Wilson, these gentlemen letting it be clearly understood that the purpose of the conference was to obtain results and not to quibble over details or petty differences.

Those who attended the conference from the Pacific Coast were as follows:

C. S. Follett, M. E. B. A. No. 38, Seattle, Washington.

Andrew Furuseth, Seamen's Union, San Francisco.

Patrick Flynn, Marine Firemen, Oilers & Watertenders' Union, San Francisco.

Fred M. White of the Seattle Shipmasters' Association.

P. B. Gill, Sailors' Union of the Pacific, Seattle.

Wm. Wescott, President Masters, Mates & Pilots of the Pacific.

John W. Starfold, Deep Sea Fishermen's Union of the Pacific.

E. A. Eastman, Sailors' Union of the Pacific, San Francisco.

Fred J. McGemikey, Marine Cooks' & Stewards' Association, Pacific Coast.

C. P. Converse, Secretary Pacific Shipping and Maritime Committee of the Pacific Coast.

J. S. Gibson, Seattle, Chairman Maritime Committee Associated Chambers of Commerce of the Pacific Coast.

R. E. Maynard, Los Angeles Chamber of Commerce.

Arthur W. Kinney, Los Angeles Chamber of Commerce.

A. Madsen, Longshoremen's Association, Seattle.

John H. Bunch, General Freight and Passenger Agent, Alaska Steamship Company, Seattle.

In all, there were 100 conferees present, and that fifteen of them should have come all the way from the Pacific Coast shows that this matter of securing an ample supply of men to man the great fleet which the United States is building is being taken hold of in all seriousness and with a clear idea of the difficulties to be overcome.

Roughly speaking, the conference was made up of thirteen men representing associations of marine engineers, eleven men representing the deck officer, twelve men representing seamen and fishermen organizations, six were present in the interest of the firemen, oilers and water tenders; cooks' and stewards' organizations sent three men; the stevedores had seven spokesmen; ten Government officials, including the Secretaries of Commerce and Labor, attended the gathering, and the balance of thirty-eight was made up of steamship men, representatives of chambers of commerce and other business people.

Toward the close of the session a committee was appointed in the following manner: three men to represent the Government were chosen by the Secretaries of Commerce and Labor; six men to represent the shipowners were chosen by the business interests, and six men were appointed by the representatives of the various Unions and Associations represented at the meeting. The personnel of this committee, which was empowered to take action without referring matters back to the conference, is as follows:

Representing the Government:

George Uhler, Inspector General, Steamboat Inspection Service.

A. Warner Parker, Law Office, Bureau of Immigration.

Ramond B. Stevens, Commissioner, U. S. Shipping Board.

Representing shipowners:
- P. A. S. Franklin, President International Mercantile Marine Company.
- H. H. Raymond, New York.
- D. T. Warden, New York.
- L. H. Shearman, W. R. Grace & Co., New York.
- Frank C. Munson, President Munson Steamship Line, New York.
- E. M. Bull, A. H. Bull & Co., New York.

Representing crews:
- William S. Brown, Marine Engineers' Beneficial Association.
- Captain Ulster Davis, American Association of Masters, Mates & Pilots.
- Captain Wm. A. Wescott, Masters, Mates & Pilots' Association of the Pacific Coast.
- Andrew Furuseth, Seamen's Union.
- H. P. Griffin, Cooks' & Stewards' Association.
- Thomas Conway, Marine Firemen's Union.

A large part of the time of the conference was taken up in discussions that could hardly be of any benefit, but interspersed among the many talks there was a considerable amount of good, substantial common sense, and this is especially true of the part taken in the proceedings by Secretaries Wilson and Redfield. These gentlemen did not mince matters and made no attempt to hide the real gravity of the crisis which confronts the American people. Let us quote from one of Mr. Redfield's short addresses to the conference:

"It is the belief of the Department of Commerce, it is our conviction now that there is at present no shortage of officers necessary for the vessels that are coming along. We think they can be provided.

"But I want to put the situation fairly to your thoughtful and quiet minds to see it as it is. The most serious factor that this country faces is that of merchant ships. There are other serious factors, but that is the most serious factor. Every call to duty comes most loudly to him who can move a ship quickly. The man who delays a ship over a day for any cause whatever, howsoever personal or intimate to himself, does wrong to his country now. It is altogether within reason to say that a single day's delay in this war, that which causes it to last another day longer than it otherwise would, may readily mean to this country 1500 of her sons and $15,000,000 of her money wasted. You will not be figuring far wrong if that is taken for a working basis, as it some day will be, I think. As regards Great Britain and France, that will be far within the fact. It is my duty, it is your duty, it is the duty of every American to see afar, to see in advance; not when the time comes, but before it happens, that every possible casue of delay, certain or uncertain, proper or improper, is taken out of the possibility.

"We want the preference given to the American boy; we want the preference given to the American officer. But there must be no uncertainty, and I do not want American boys killed in France because I had to wait twenty-four hours for an American Captain when I had an Englishman on the dock. That is my attitude. That has got to be our attitude, gentlemen. Service together. I am afraid you men do not realize the awful strain this nation is going to be under. We must not let any personal wishes, preferences, convictions, habits and enthusiasm as to our own way—we must go ahead without a stop. But in the broadest way, I pledge to you my word that every preference will and ought to be given, must be given, to the American boy.

"If we can have twenty-five ships emerging in a week, big fellows, let us hope more than that in a week ready to go, must we keep them overnight for lack of boys to man them? We ought not, if they are so kept overnight when otherwise they could go American boys yonder will die. This is not a question of conviction, it is a question of life and death."

In closing the first day's proceedings, Secretary Wilson spoke in part as follows:

"No government ever suffered more patiently in dignity, absolute dignity, than did the government of the United States. It felt confident of its state; it felt sure of its purposes; its motives were clear, and it could afford to be patient. But when the German Government, after saying to us that it would withdraw the policy of destroying the lives of our people without notice and without warning, certainly insisted upon restoring the policy of the destruction of the lives of our people; when almost in the same breath it held out the temptation to Mexico to join with the German Government in an aggressive policy against the United States, promising Mexico that portion of our country included in Texas, in New Mexico and Arizona in return for the enterprise, and held out the inducement to Japan that if she would engage in an aggressive policy against the United States Government that all of the great Western territory from the Rockies through to the Pacific would be her share of the prize; and then, in addition to that, thought to impose the will of the kaiser upon us by saying to us 'One day a week you may send a vessel to Falmouth, provided you mark it like a barber's sign,' there was nothing left for us to do but to say to the kaiser, as was said in the cartoon, where the kaiser and Uncle Sam are standing face to face together, and the kaiser is saying to Uncle Sam, 'One day in the week you can go to Falmouth' and Uncle Sam replied with great vehemence 'Seven days in the week you can go to hell.'

"So I have had this in mind, saying to these gentlemen who are representative of labor: 'This is no time to stand for a recognition of the Union'; this is no time to insist upon working with no one else but Union men. This is a time when your duty requires that you shall lay aside your prejudices, that you shall lay aside what you conceive to be your economic interests, and say to those who are engaged in the shipping trade: 'We will work alongside of a non-union man; we will teach the non-union man as rapidly as we can teach him, if he is a new man and needs teaching; we will make him an efficient sailor and we will take our chances of getting him into the sailors' union after the war is over.'

"You men who are the representatives and managers of the shipping interests, I want to say to you that this is no time to stand upon your rights, to insist upon nothing but non-union men. You may have that right, but you are not compelled to exercise that right. You can either exercise it or refuse to exercise it, and in this crisis it is no time to insist upon exercising rights that drive those away from seamanship who would otherwise come into the service and give us the necessary skilled men to man our vessels up to the highest number that it may be possible for us to put upon the same."

At this juncture Mr. Furuseth objected to the appointment of any committee until the representatives of labor had all been heard, and this point was carried, the conference going over to the second day.

The second day's proceedings were opened by an address by Mr. Furuseth, an address that had at least one radical proposition in it, and that was to place the German members of the seamen's union on the coastwise ships, thus releasing a larger number of men for the deepsea work.

In referring to the patriotism of the seamen, Mr. Furuseth opened his remarks as follows:

"Mr. Chairman, as an opening sentence I desire to call attention to the statement of Captain Gibson, from Seattle. Captain Gibson appeals to the seamen to exhibit patriotism, and as an evidence of his own patriotism he stated that he came across the continent and that he was willing to go as a master of a transport. I have not the slightest doubt but that there are a thousand masters who will be extremely willing to go as masters of transports. I think Captain Gibson would prove his patriotism more definitely by offering to take charge of a tramp, filled with ammunition, that is treading its way across the Atlantic between the U-boats for the purpose of landing the necessary supplies in France. The sailors, firemen, cooks and stewards are sailing in those boats now; they are not making any bones about it, but they are willing, and I do not think that there has been any difficulty in getting men for the places. I want to say to you gentlemen here that they are sailing and that they are taking all the chances that are to be taken in the matter largely because the United States passed the so-called Seamen's Act and made the seaman a free man."

We are very pleased, indeed, to learn that the seaman is so filled with patriotic fervor, and this certainly bears out the many statements made at the time of the fight in Washington over the seamen's bill that the creation of a splendid body of Ameriacn seamen that could be called upon by their country in time of war would be one of the results of this so-called "emancipation of the seamen." Unfortunately, however, there is a darker side to this picture, and one does not have to travel very far from the headquarters of the Sailors' Union of the Pacific to find it. The Government is commandeering ships and will have to have crews for these vessels. For this purpose an office was opened in San Francisco to enlist men of every capacity serving in ships' crews in the auxiliary naval reserve. The duties asked of these men involved practically no sacrifice whatsoever. Enlistments in this auxiliary naval reserve have been going on slowly—firemen, oilers, engineers, mates, stewards, cooks, waiters, cabin boys, have signed up—but up to the first of the month just passed, not a single able-bodied seaman has signified his intention of helping out the United States Government by signing up as a reserve man in the body from which the Government hopes to make up its crews for commandeered new ships. Were these men waiting for the outcome of the shipping and labor conference at Washington? Whatever they have been waiting for, and whatever claims may be made for their patriotism, there are at least some people whom it will be hard to convince, and among these are the men who have interviewed these able-bodied seamen with a view to having them enlist in the auxiliary naval reserve. These men have been told that they (the sailors) owe the United States nothing, that they don't give a damn for this country.

In this connection it must be remembered that very few of these sailors are American citizens, but that the most of them have been knocking around American seaports long enough to have become citizens if they so desired. Frankly, we would like to ask, just how much pressure have the leaders of the seamen in this country brought to bear upon their men in order to persuade them to become American citizens? Surely a government that, according to Senator La Follette, brought the sailor up out of slavery and made a free man of him should hardly expect less in gratitude than that these new freedmen should become citizens.

Touching once more on the foreign complexion of our sailors, Mr. Furuseth has the following to say anent this rather startling scheme to utilize German sailors on the remarkable argument that a sailor sort of loses his nationality and becomes a citizen of such and such a ship rather than such and such a country

"According to a census which we have taken, there are about 5,000 Germans sailing under the American flag in different capacities. It may be said that they are among the highest skilled men, whether they sail in the forecastle, in the fireroom or in the galley. Of these men—about 5,000 all told—3,721 are in the organizations of the seamen, and figuring it up on the same basis, of those outside organizations there should be at least 5,000. It is a very serious matter to displace them, and I want to suggest the serious thought, based upon the psychology of seamen as I know, whether it would not be well to use those men where they can be used in order to release other men for the trans-Atlantic trade. The importance of the matter is to get highly skilled men. A fast vessel and a highly skilled crew is the real defense against a U-boat.

"When a seaman has begun to sail in different vessels and, in a sense, divorced himself from his own country, his primary loyalty is to the ship he is on and to his shipmates, and I do not think that there is any danger in making use of those men in the purely coastwise trade and in the Lakes trade. It may be said that they can destroy some thing in the Lake trade, but that anybody can do if they particularly want to do it, if they are for sale and they disregard the shipmates they are sailing with."

Now we do not doubt but that ninety-five per cent of the Germans in the sailors' and other maritime unions care very little about the German government, and are at worst indifferent if not favorably disposed toward the Government of the United States. But who is going to weed out the dangerous five per cent? What government would be willing to permanently place itself on top of a volcano just because the volcano had been quiet for a few days or weeks?

In replying to the suggestion of Mr. Furuseth, Secretary of Labor Wilson settled the question on one single point of argument, and settled it in a dignified and unanswerable way, as follows:

"I want to thank Mr. Furuseth for his suggestion relative to the manner in which we might utilize the services of alien enemies, either present or prospective, in our coastwise shipping. I particularly desire to thank him for giving us the benefit of his knowledge of the psychology of the seamen. Knowing of his vast experience, I have not any doubt that his interpretation of that psychology is correct, and that when a seaman has left the vessels of his native country and for a prolonged period of time has been sailing in the vessels of any other country, that his primary allegiance has been changed, and that instead of that primary allegiance being to the mother country that the primary allegiance is thereafter to the vessel upon which he is sailing and to the crews with whom he is associated. But, in administering the situation during war periods we have to take into consideration not only the psychology of the crews, but we have to take into consideration the psychology of the entire American people, and in considering the psychology of the American people you have to analyze what the interpretation will be that they will place upon permitting alien enemies to engage in any line of work where they may be able to do an unusual amount of damage. We may have confidence in our own minds that alien enemies of the type described would not be likely to do any damage, but while we may have that opinion in our own minds, there are a hundred million others in the United States, and they have varying viewpoints upon the subject matter, and if yielding to our own confidence that no danger would occur from allowing these alien enemies to engage in this line of work, there nevertheless occurred a serious disaster traceable to alien enemies, the furore that would spread over the country would be so great that no administration could stand up against it. So the administration must of necessity, taking into consideration the psychology of all of our people, take the necessary steps to be sure that our government is protected against the possibility of disaster if it can take such steps."

WAGE SCALE AGREEMENT

At a conference at Washington consisting of the fifteen men who were chosen at the shipping conference held in Washington on August first and second, an account of which together with the names of the committee will be found elsewhere in this issue, the wage scale, which will remain in force until a year after the war ends, is as follows: Sailors and firemen, $60 per month; coal passers, $50 per month; oilers and water tenders, $65; boatswains, $70; carpenters, $75. Overtime pay for cargo work is figured at 50 cents an hour, and for ship work 40 cents an hour. A 50 per cent bonus is to be paid crews entering the war zone. Employers will pay each seaman $100 compensation for loss of personal effects when a ship is sunk. The scale of wages and bonus for stewards and cooks is unchanged at present.

In order to increase the number of men available for work, each ship will carry a certain number of boys in proportion to number of seamen carried. The number of able-bodied seamen will be reduced; the deficiency will be made up by employing more ordinary seamen. Representatives of the seamen's organizations will be given access to docks and decks.

The committee agrees that bonus and other conditions arising from the war shall terminate with the war, but the wage scale named above shall remain in force for a year after the war terminates. Employers and seamen will unite in an appeal to men who have left the sea to return, and to young men to go to sea as a profession.

The Provost Marshal General's Office will be requested to exempt seamen from military service wherever it can be done, on the ground that the scarcity of sailors makes them more valuable in that capacity than as soldiers.

This is merely a ratification of an agreement which a number of Atlantic Coast steamship concerns had already made with their firemen, sailors and stewards. It should be clearly understood that the scale given is not recommended to anyone, in other words a group of Atlantic owners have merely ratified a previous agreement and this agreement is not binding on anyone but those who had originally accepted it. It is evident that nothing great has been accomplished towards increasing the available number of men for sea duty and there will be further complications in the case of some of the commandeered ships whose accommodations do not comply with the American law and on which the loss of time to make alterations cannot be countenanced.

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SHIPPING BOARD CHANGES

DEVOUTLY wished and hoped for, the changes in the United States Shipping Board came none too soon. Mr. Denman was filled with an insatiable desire for discussion, and General Goethals wanted as little of that commodity as possible. Between them there was certainly no opportunity for adjustments. One was a man of very large calibre and the other a personage of no calibre at all, and both were trying to hold down jobs for which they had no special training. The country is to be congratulated that the builder of the Panama Canal is now released from a disagreeable task and can be secured for services to his country in a capacity where the most can be made of his undeniable powers.

The selection of Washington I. Capps to succeed General Goethals would seem to indicate that the powers that be have been forced to the conclusion that a mixture of civil engineers and dyed-in-the-wool politicians is not just the very best material from which to choose men to build and handle ships. In Admiral Capps the Government has found a man who thoroughly understands the steel ship at least, and who will not be led away on any will-o'-the-wisp in the matter of freak designing.

Admiral Capps was born at Portsmouth, Va., January 31, 1864. He graduated at the United States Naval Academy in 1884, and served on the U. S. S. Tennessee from 1884 to 1886; was promoted to ensign in 1886 and appointed assistant naval constructor June 6, 1888. He attended the University of Glasgow, Scotland, where he graduated with the degree of bachelor of science in 1889, and on his return to the United States began his active work in naval construction. He was assigned to duty at Cramp's shipyard in 1889, and from 1889 to 1892 was on duty at the New York Navy Yard. From 1892 to 1895 he was on duty at the Bureau of Construction and Repair, and from 1896 to 1898 superintended construction for the Navy at the Union Iron Works. During the Spanish War, 1898-99, he was on special duty on the staff of Admiral Dewey, commander-in-chief of the Asiatic Station. From 1899 to 1901 he was a member of the Board of Inspection and Survey, Washington, and from that time until 1903 was head of the construction department of the New York Navy Yard.

On October 31, 1903, he was appointed Chief of the Bureau of Construction and Repair, with the rank of Rear-Admiral, and was reappointed in 1907. He resigned October 1, 1910, and was given a permanent commission as Chief Constructor with the rank of Rear-Admiral, from that date in accordance with an act of Congress approved June 24, 1910.

At the time of his designation as General Goethals' successor, Admiral Capps was president of the board on hull changes on vessels building for the Navy on the Atlantic Coast; senior member of the Naval Compensation Board, and a member of the Navy Yards Commission. He is a member of numerous scientific societies in the United States and abroad. In 1912 the University of Glasgow conferred upon him the honorary degree of doctor of science.

No less important than the appointment of Admiral Capps are the changes that have taken place in the personnel of the Shipping Board. That body could still be improved a great deal, but the last appointments have made it a much stronger body than it was formerly. Edward N. Hurley, who is the new Chairman of the Board, was a former Chairman of the Federal Trade Commission, and as President of the Illinois Manufacturers' Association he has proven time and time again that he has the cause of the American Merchant Marine at heart. Mr. Hurley, besides executive ability, brings the Shipping Board the confidence of the business world. The appointment of Bainbridge Colby to succeed Captain White is by no means such a fortunate change as that which took place in the chairmanship. Mr. Colby is a New York lawyer and politician, and, as far as we can learn, has had no training that would in any way fit him to sit on a shipping board.

OUR COASTWISE SHIPPING

THE U. S. Department of Commerce authorizes the following:

With the approval of the Secretary of Commerce, the United States Shipping Board has submitted to the Merchant Marine Committee of the House of Representatives a draft of a joint resolution empowering the President to permit vessels of foreign registry to engage in the coastwise trade. The suggested resolution reads:

"Resolved, That during the present war or emergency the President may, if in his opinion the interests of the United States so require, permit by proclamation vessels of foreign registry to engage in the coastwise trade of the United States, within such limits and under such conditions as he may deem wise."

Secretary of Commerce Redfield authorized the following statement regarding the resolution:

"The chief purpose of the resolution is to allow Canadian vessels on the Great Lakes to do coastwise business between American ports. The Canadian government very handsomely acted on the matter some time since as concerns us, allowing the coastwise privilege to American vessels in Canadian ports.

"There is urgent necessity for the employment of all possible tonnage on the Great Lakes in the coal and iron ore hauling. Owing to the very late spring, the navigation season opened some three weeks late. Also, the railroad situation at that time was complicated by some confusion and car shortage. Consequently, the stocks of coal at lake distributing points are thousands of tons short of what they should be. If we have an early winter and consequent closing of lake navigation, there would be caused much suffering and damage to industry in the Northwest on account of shortage of coal.

"So it is important to get every possible bottom carrying coal to the Northwestern points before navigation is stopped. The vessels in this trade bring cargoes of iron ore back to American ports and then take coal on the outbound trip. The unprecedented demand for iron and iron ore makes the need for additional ore carriers acute; almost as much so as for more coal carriers. Also, these vessels will bring grain down in addition to iron ore. There are numerous Canadian vessels that will engage in this trade if the present restrictions are removed during the war emergency.

"We need greater freedom in coastwise trade. Suppose, for instance, a British vessel discharged cargo at Norfolk and was ordered to Galveston for a cargo of cotton. Supose also that there was need of coal at Galveston and this vessel could carry a considerable amount and had cargo offered. It could not take that cargo without subjecting itself to heavy penalties as matters now stand. As badly as coal is needed in New England for stocks, the vessel could not proceed from Philadelphia to Boston with coal. It could not take lumber for shipyards, or anything else.

"The Secretary of Commerce has the right under the law to remit these heavy penalties and has been doing so in particular instances; but the Shipping Board thinks—and I heartily concur—that to have the coastwise penalties suspended generally will prove of considerable benefit."

The whole matter of participation of foreign vessels in our coastwise trade is one that has been more or less spiritedly discussed for many years. To open up the coasting trade as an emergency measure during the life of the present war possesses certain undeniable features of advantage to the country, but in this connection there is one certainty that must not be lost sight of. If the bars are let down temporarily there will be a determined fight to prevent them being raised again when the emergency is over.

It will be remembered that in the case of the Philippine Islands the coastwise laws of the United States were suspended for a fixed period of years following the Spanish-American war. The reason for this course was obvious. Practically all the inter-island trade in the Philippines was being taken care of by British shipping, and it was held in Washington that this shipping should be given a term of years to seek other channels of trade. At the end of the time allotted, the period for readjustment was renewed, and when the renewal expired the time was once more extended. In short, it has been the experience of shipping in this country that it is very easy to pass certain classes of legislation, but extremely hard to have laws, whether they be temporary or otherwise, abrogated.

Secretary Redfield says: "Suppose, for instance, a British vessel discharged cargo at Norfolk and was ordered to Galveston for a cargo of cotton. Suppose also that there was need of coal at Galveston and this vessel could carry a considerable amount." Here we have a condition that presents apparently an unanswerable argument in favor of suspending the coastwise laws of the United States in time of emergency, but this very same condition is one that presents a most potent argument on the other side of the question in times of peace. Under normal conditions, this same British vessel would accept any old rate on coal to Galveston rather than run down in ballast, and would thus deprive some American coasting vessel of legitimate business. The American vessel would be held answerable to the Interstate Commerce Commission for her freight rates, the British vessel would be held answerable to no one.

There have been strong influences at work in this country for many years to have the barrier set up by our coastwise laws broken down, and the American shipowner may rest assured that once the bars are down, even temporarily, there will be a strenuous fight to make the wide-open conditions permanent.

SHIPBUILDING MAKES HEAVY DEMAND ON LARGE TIMBER

The large number of vessels that have been contracted for along the South Atlantic and Gulf coasts have presented quite a problem to the dealers in southern pine. The large dimensioned, long-length timbers called for in the Government designs have been the chief difficulty, and in this regard the Southern Pine Association has issued the following:

Proposed changes in specifications of timber entering into the construction of the government's fleet of wooden steamers, which will make possible the cutting of a much larger quantity of such material by Southern mills, may receive the serious consideration of the United States Emergency Fleet Corporation, according to J. E. Rhodes, Secretary-Manager of the Southern Pine Association, who returned to New Orleans recently after an absence of several weeks in Washington.

"The Southern Pine Emergency Bureau," said Mr. Rhodes, "has suggested to the Fleet Corporation the advisability of abandoning the present Ferris model of standard 3000-ton wooden steamer and the substitution of another which would make it much easier for sawmills to get out timbers that are required for ships, and which would also enable a larger number of mills to cut such timbers. The new specifications suggested call for shorter lengths and smaller sizes.

"Boats of a similar capacity to the proposed government ships are now being built on the Gulf of smaller timbers, and while the Emergency Bureau was able to secure commitments for more than a sufficient number of mills to cover its blanket order of 100 complete schedules for the Ferris type of ship, the Bureau has stated to the Fleet Corporation that there would be difficulty in securing any considerable number of additional schedules on the original specifications. On the other hand, there would be no trouble in obtaining almost any number required if the specifications were modified as suggested.

"W. J. Haynen is now traveling among the longleaf yellow pine mills as the representative of the Fleet Corporation, with authority from Admiral Capps to take such measures as he may think necessary to secure the desired material. Mr. Haynen has not yet determined whether a change in specifications will be necessary to obtain the timbers required to build all the boats contracted for and proposed by the Fleet Corporation, which number nearly 100 in addition to the contracts already let."

REDUCTION GEARS FOR MOTORSHIPS

IT is highly interesting to note that the question of reduction gears for motorships is receiving serious consideration and that the firm of Libby, McNeill & Libby are to fit such a gear on their latest motorships. The engine in this craft will be made by the Dow Pump and Diesel Engine Works and the hull will be built by Standifer.

For slow moving cargo vessels nearly all types of internal-combustion motor operate at too high a rate. This is true, in a modified degree to be sure, but nevertheless true, even of such successful engines as the Werkspoor and Burmeister and Wain types. The large motorships that have so successfully operated in all of the Seven Seas require more shaft horse power for a ten or eleven knot sea speed than the same hull would require with a slower moving and larger propeller. This loss in propeller efficiency naturally becomes more apparent as the size of the power installation and consequently the size of the propeller or propellers decrease. In the face of a head wind and sea, the advantages of a large slow moving propeller become quite marked and it seems strange that the gearing of at least the smaller units in internal combustion engines has not been more generally resorted to.

We now have on this coast a considerable number of four and five masted schooners propelled by twin screws driven by 320 brake horse power internal combustion motors. In connection with these craft it has often struck the writer that it would be entirely feasible to gear such a pair of engines onto a single shaft with the propeller making seventy-five or eighty revolutions. There would, of course, be the loss of power in the gearing to reckon with, but this would be far more than offset by the increased ability of the vessel to hold her speed under all conditions of weather. One of the engines could be non-reversible and could run idle when the other was reversed for backing. The saving effected by doing away with one set of line shafting and having one of the engines non-reversible would go a long way towards paying for the reduction gear.

On the other hand the large propeller would offer greater resistance in case the vessel was using her sails, but in this connection it must be remembered that while the original idea in building most of the so-called "auxiliary schooners" on this Coast was to have the engines act as auxiliaries to the sail power, the idea is now reversed and it is the sails which are treated as a second consideration.

The question of gearing down internal combustion motors to the most economical propeller speed for freight boats is one that presents many points of interest and one on which there are many arguments pro and con so that the outcome of the installation on the new Libby, McNeill & Libby boat will be watched with great interest.

The Building of a Great Motorship Fleet

(From the Russian of Emanuel L. Nobel)

By T. Orchard Lisle

TODAY the world's greatest fleet of heavy-oil engined motorships is that owned by the Nobel Naphtha Productions Company, of Russia, whose total fleet is represented by nearly half a million tons, over 50 per cent of the propelling power of which consists of internal-combustion oil engines, mostly of the Diesel type.

The story of how this remarkable motorship fleet was started and developed into a shipping business of vast importance is related by Emanuel Ludwigovitch Nobel himself in our Russian contemporary "Teplocod" (Motorship). How their early struggles with the Diesel engine were beset with difficulties, but were overcome and success eventually attained, could well be taken to heart by our own great oil companies. Millions of dollars must have been spent by Nobels during the course of this work. Mr. Nobel demonstrated a great faith in Dr. Diesel's invention right from the time of the initial discovery of the cycle, and today reaps the benefit of his foresight and confidence, he being one of the wealthiest men in Russia. Even in the earliest days there was no doubt in his mind as to the tremendous importance of the economical advantage of this type of motor and the limitlessness of its uses. It is no wonder that two large Diesel ships—one Russian and the other Belgian—were named after him in honor of the great work he has accomplished for shipping.

For the mechanical side of the development, very great credit is due to Mr. E. L. Nobel's brother, Ludwig (Louis) Nobel, who now controls the huge Nobel Diesel-engine works at Petrograd, where over one hundred thousand brake-horsepower had been turned out up to 1915. For years the pioneer work done in Russia remained almost unknown outside of that country. It was Harry Lane, of Lane & Macandrew, the London shipowners, who went to Russia to investigate, and when he found out the wonderful progress being made in the way of big motorship production, came back and privately persuaded many great British and European shipowners to build such vessels. It was Mr. Lane's action that really started the great European Diesel motorship building boom of 1911-1913. At that time Mr. R. W. Crowly and the writer made known to America and to the world what the Nobels had accomplished, apparently these three persons being the only ones outside of Russia and Germany having the knowledge regarding the progress made.

This reminds the writer of a humorous incident which may be told against Mr. Harry Lane, the teller of which was a party who happened to be the friend of both Mr. Louis Nobel and Mr. Lane as well as of the writer. The well known apathy of some wealthy Russians to Jews is not disconnected from the joke. "Lisle is a good fellow, but I don't like him because he is a Jew," said Mr. Lane during the course of a conversation with this mutual friend. Shortly afterward the latter went to Petrograd as the guest of Mr. L. Nobel, and the matter of Mr. Lane's visit cropped up. "Lane is a nice chap," remarked Mr. Nobel, "but I don't like him because he is a Jew." The amusing point of the matter is that neither Mr. Lane nor the writer happens to be a Jew.

The Nobels, by the way, are of Swedish descent. The name Nobel appears for the first time in the Russian Empire in 1857, when, at the invitation of the Russian government, there came from Sweden Prof. F. E. Nobel of the Stockholm Technological Institute. He established the first Russian plant for the manufacture of undersea mines which were his own invention.

The Nobel Naphtha Productions Co., of which Mr. Emanuel L. Nobel is the head, is the greatest oil-producing company in Russia, and after the war, when the Black Sea once more is opened to commerce, their competition in Europe no doubt will be severely felt by American oil companies. This company is associated or very friendly with the Royal Dutch Shell Petroleum Co., so it is no wonder that the latter company also has a large fleet of motorships, which includes the motorship "Emanuel Nobel." Between them they have over one hundred Diesel and surface-ignition oil-engined vessels in service, most of which are tankers.

Mr. Nobel in his story relates how the construction of Mr. Diesel's first engine in 1897 at the Augsburg Maschinenfabrik, Germany, did not impress most mechanical and industrial circles of the actual prominence of the new invention over previous types of internal-combustion motors; but he foresaw the great field for it in Russia if it could be perfected, and so he endeavored to obtain co-operation from other manufacturers.

Not one Russian concern would lend itself to the development of the Diesel engine, so the work of developing it remained for the Nobels alone. This great task took about one year, and the first Diesel engine to be turned out by Nobels was completed in 1899, they working under a license from the Augsburg Maschinenfabrik, where Laus-

Mr. Emanuel L. Nobel, Russia's most prominent engineer and the man who has probably accomplished more than any one living for the advancement of the Diesel engine.

ter also assisted Dr. Diesel in making a practical prime mover of the invention. This first engine of Nobels was for land purposes.

In the first four years of its activities the Nobel factory made ten different Diesel models up to 150 horsepower.

The rapidly improving prospects of the Diesel engine and the inability of the Nobel factory to meet the demands of the market impelled the Nobels to again propose to other Russian manufacturers the construction of Diesel engines. At the end of 1903 its manufacture was undertaken by the Kolomna works, followed in 1907 by the Velsor works and in 1909 by the Nicolaieff shipbuilding works. Finally, in 1911, the Sornovsky works began the manufacture of the Diesel motor.

The first engine built at the Nobel works proved economically more valuable than the Augsburg model which its builders had followed. Its improvement continued steadily until, in the newest types, the fuel consumption was reduced to the lowest possible limit.

The tireless activities of the Nobel brothers resulted in the introduction of a number of important improvements, many of which eventually were universally adopted, and some are used today, with slight variations, on both American and French Diesel engines.

The difficult problem of adapting the engine for use in submarines was finally solved at the Nobel works, although there seems to be some dispute as to whether France or Russia was the first to install a Diesel engine in a submarine; but there can be no doubt that Nobels were the first to build a marine four-cycle type Diesel engine that would successfully reverse.

The combined factories engaged in the manufacture of Diesel engines finally perfected seven different types in forty-five different models, one of which was the lightest in the world. This was a Diesel with eight V-shaped cylinders.

E. L. Nobel understood at the outset that only by construction of motorships of the largest type would it be possible to remove all doubt from the minds of those who continued to believe that the Diesel motor would never do as a means of propelling merchant freighters, passenger liners, and war craft.

In 1903 the Nobel company produced for the first time in the history of marine navigation a large seagoing motorship. She was called the "Vandal." She was followed in 1904 by the "Sarmat." Both vessels were equipped with electric transmission, and the "Sarmat" also had reversing engines. To the credit of the workmanship, it may be said that the engines of these vessels today are running regularly on land, the hulls having long since been broken up.

The appearance of these two motorships marked the turning point in Russian shipbuilding and awoke a sudden interest in industrial circles all over the world. In developing motorship construction in Russia, Nobels gave a powerful and far-reaching impulse toward this type of ship.

Many European shipowners and shipbuilders began to see that the substitution of the Diesel for the steam-engine, both at sea and ashore, made it possible to effect a colossal economy in fuel consumption.

The development of the motorship is closely bound to the development of the naphtha industry. In that respect E. L. Nobel, as the controlling mind of the Nobel company, performed a great service for motorship navigation by organizing the domestic market and by the production of special sorts of fuel and lubricating oils. By reason of the wonderfully economical transportation afforded by his great fleet of motorships, he won a difficult triumph in foreign markets and was enabled to establish the independence of his oil company as a great Russian enterprise, and no other oil company has been able to become a formidable competitor to him in Russian territory.

Many Russian shipping companies enterprisingly followed his example in building motorships, including the Caucasus & Mercury Steamship Co., who have a fleet of twenty-four Diesel-engined vessels, of which twelve are of 1000 shaft-horsepower each. This shipowning concern is one of those who have publicly announced their entire abandonment of steam-engines and boilers in favor of Diesel motors for the propulsion of ships.

The Imperial Russian Admiralty also gave very considerable encouragement to Nobels by placing orders for twelve armored motor gunboats, each of 1000 b.hp. in addition to orders for dozens of submarine engines. One order alone was for twenty submarine Diesel engines, each of 1300 hp. In fact, at more than one period the Nobels' Diesel Engine Works were so busy that the Nobel Naphtha Productions Company were obliged to place orders for the motors of their tankships with the great Kolomna Works at Golutwin, Moscow. This also calls to mind that the actual constructional work of the two engines of the "Vandal" were built at the factory of the A. B. Diesels Motorer, Stockholm, Sweden, from Nobel designs and under Nobel supervision.

All glory and honor be to the name of Nobel, and every marine engineering society should erect in their buildings some fitting tribute to Emanuel and Louis Nobel for the great work that they have done for mercantile and naval marine shipping.

The United States is not yet fully awake to the enormous value of the pioneer work Nobels zealously carried out regardless of expense, but the time will come when it will be appreciated to the full. Let us not forget to whom the credit is due.

Mr. Nobel's story teaches a splendid lesson in perseverance against far greater odds than shipowners of our own country have had to contend with in their comparatively feeble efforts to obtain motorships. Nobels spent a fortune before they secured even reasonable success, and is it not enough to make us as a nation all feel ashamed that many domestic shipowners apparently love the profit side of their balance sheet too much to similarly assist the progress of the oil engine and motorship in America? Otherwise, why is it that the Diesel engine still is regarded with the suspicion and thought of causing a possible loss if adopted? The slogan, "Let the other man do the experimenting," still reigns in American shipping circles; but there is one happy indication that its throne is tottering and that soon America may proudly possess the world's greatest number of motorships.

Ships While You Wait

By Pierre N. Beringer

The idea of the concrete ship or boat is not a new one. Diligent search shows that the first recorded case of the building of such a boat was by one M. Lambot, of Carces, France. This small boat was built of reinforced concrete and was constructed in 1849. It is still afloat and has given a service of sixty-eight years.

France gave the idea to mankind, but it remained for the Norwegians to put it to practical use as to vessels of larger tonnage. Many successful concrete boats of their manufacture are now afloat. There is one American instance of a barge on the Welland Canal, well named the "Pioneer," which has given the best of service during the past six years. It has been strenuous service, too, and the "Pioneer" has been bumped and collisioned, but it has stood the test of time and use splendidly and shows no sign of deterioration. Barges have been built and operated successfully in other parts of this country.

Beautiful power-boats have been built by the Concrete Products plant at Porsgrund, Norway. These boats were of small dimension, but the same company is now turning out boats very rapidly, made of concrete, of 200 tons capacity. Concrete lighters have been in use on Chesapeake Bay for the past six years. These lighters are seen daily doing their duty carrying coal and sand. These are usually 500-ton vessels. The Manchester Ship Canal Co., England, has had a type of concrete pontoon, or barge, in use for a long time. These were built by the Yorkshire Hennebique Contracting Co., Ltd., of Leeds, England.

On the Panama Canal a similar type of pontoon has been in use on various sections, and, recently, pontoons were built as landing stages for boats up to 65 feet in length. These pontoons are 125 feet long, beam 28 feet and have a depth of 8 feet. Norway was the first to solve the problem of the ocean-going concrete carrier; as an evolution from the barge operated in comparatively still waters. It had been, and with some still is, a question whether a concrete vessel has the buoyancy and the resiliency to stand the battering of the waves of the ocean. The answer to this question is found in the consular report of a Consul General of the United States at Christiania, Norway. He describes a plant at Moss, Norway, where three thousand ton displacement vessels are in course of construction.

The so-called inventor of this type of vessel is named Nicolai Fougner, an engineer, who claims to be able to construct any type of vessel, of any type and of any size. A ship, constructed by this company, arrived at Christiania, Norway, in June of this year, and it is said to resemble "a large barge, except that its ribs are of steel."

The Swedish Minister of Marine, Mr. M. Bronson, who was present with shipbuilding experts, was so impressed with the performance of this vessel that he immediately placed an order for an ocean-going vessel of several thousand tons displacement. The same works now have two other large vessels on the ways and one 4000-ton craft is just about completed.

One Carlo Gabellini, of Rome, Italy, figures as the valiant producer of "stone ships." He points to the vessels, the "Liguria" and the "Ettore," as fine examples of his art. These are small vessels of extremely graceful lines and he has carried out the artistic style in the building of many large concrete pontoons, avoiding the square nose and the ponderous architecture usually giving barges and pontoons their unattractive appearance.

Now Norway comes forward again, with a sort of triumph in concrete vessels, and turns out a 3000-ton Diesel engine motorship of ferro-concrete. This was built for Sydvaranger Mine Co. of Norway. It is used for ferrying iron ore over the North Sea. The actual builder is Fougner, to whom reference has previously been made, and the latest news is that, spurred on by the great success in rough seas, he has in course of construction several vessels of 5000 tons capacity. This seems to be the final reply to those who maintain that ferro-concrete vessels cannot stand the stress of rough seas.

The first concrete boats in Holland were built by the Fabrieck Van Cement-Isjer Werken in the year 1887. This concern first built barges up to 11 tons, but later on began the building of boats of larger capacity.

Last & Co., also of Holland, triumphed over all others by giving beauty of shape to their vessels, and built sailboats of concrete and wire mesh, reducing the thickness, it is said, to the remarkably thin average of one-half inch. Johannes Lescher built one of the most shapely sailboats ever made of any material, of reinforced concrete. Mr. Lescher, who is a citizen of Dresden, Germany, gave his boat many tests, such as sailing about in very rough weather, lifting it by the middle by the use of a crane and letting it stand full of water poised on the middle of the keel. This boat gave perfect satisfaction and is still in use. Built in 1912.

It is of the greatest importance to note that the barge "Pioneer," used on the Welland Canal since 1910, does not show a sign of leakage. Mr. Weller, the chief engineer, in a recent interview, pointed out a "bump" received and remarked "that was a bad one," but showed also that the vessel did not leak at this point or anywhere else. This vessel is of a uniform thickness of 2½ inches, bottom, sides, walls and decks. It is always clean and wholesome and never needs pumping out.

The United States has not been backward in evolving splendid ideas for the building of such vessels, there has been a lack of interest on the part of people and capital as far as building is concerned. The concrete ship is still a nine days' wonder!

E. Lee Heidenreich, of Kansas City, Mo., has designed a system of construction of a very practical ship, to be used as a transport. Carl Weber, of the Cement Gun Construction Co., has applied for a patent on a concrete ship. Lorenzo D'Adda has a patent for "Concrete Reinforcement of Battleships"; O. F. Lackey, patents on "concrete scows"; W. E. McNeillie, "concrete vessels reinforced with angle irons and wire mesh." A. Holin is the inventor of a "floating body with reinforced concrete frame and hull"; J. T. Gorsuch, "reinforced scows." H. E. Smith claims new ideas in a concrete ship. S. D. Hendricks has patent papers on "reinforced concrete unit construction for barges and ships."

F. Huntington Clark, the New York engineer, formerly a member of the Shipping Board, is credited with the "conception" by some and "invention" by others of the concrete ship, according to the New York press. Mr. Clark has simply perfected designs based on an old idea and has been successful, it is said, in forming a company for the building of a concrete ship, with the idea of continued construction of that kind of vessel.

There is now being built at Redwood harbor, San Francisco bay, a large concrete vessel; this will be 300 feet long and has a beam of 46 feet and a depth of 24 feet. It is being built under a secret process and the invention is that of Kenneth McDonald, Jr. Ten San Francisco business men have subscribed the necessary funds. The "secret process" is said to give concrete the elasticity of steel and its tensile strength.

Twelve years ago a Mr. Rittenhouse Moore, since deceased, was traveling through Italy, and his attention was called not only to the Gabellini boats described in this article, but to the method of construction, which he found very crude indeed. This was largely hand labor; the grout or mixed concrete being spread over the wire mesh by tedious labor of men crawling about on hands and knees and doing all of the work with tools of the most primitive character. These men were building a concrete barge.

Mr. Moore was engaged in a very extensive contracting business on the Atlantic and Gulf coasts. He became interested at once and brought a gang of men and a foreman with him to this country. These he put to work and he soon had several of these barges on government contracts along the Gulf coast and the lower Mississippi river.

These barges were found to be very buoyant and stable. As the labor was all done by hand, from mixing to spreading, the cost was excessive, and this set Mr. Moore to thinking of how this might be done away with entirely or sufficiently so as to make the cost of labor less.

Engineers connected with the Ransome Concrete Machinery Co. were called into consultation, and they decided the best method would be to build a hull from 300 to 400 feet in length and use a light steel frame and "shooting" the grout or aggregates into place by the use of pneumatic grout machines. The keel, stern post and bow to be a light steel girder. At intervals, along the length of the hull, a light channel iron was to be used for ribs, bent to the proper shape. The ribs were to be connected with light reinforcing rods or by wire mesh or both. The concrete was to be 1-2-4 mixture, the aggregate being either gravel or crushed stone to pass a ¾-inch ring. A light steel form could be designed that would be standard and could be used for many boats. The thickness of the concrete must depend on the length of the ship. When first thought of it was considered that waterproofing might be obtained by painting with tar or by the application of some other kind of paint. This, too, it was thought, would prevent deterioration through salt water. We have no data giving us the material used by the Norwegian constructors to prevent deterioration through salt water, but the science of mixing or, as the mixer machine manufacturers prefer to call it, the "art" of mixing, had advanced very materially in the last few years, and especially as to mechanical or pneumatic mixing and as to the mixes and materials to be used in waterproofing. Hydrated lime, if properly used, makes concrete absolutely waterproof, and if hydrated lime were used in the mixing of concrete in shipbuilding the additional painting with salt water-proof paint would effectively prevent the deterioration. Hydrated lime would also make the concrete more plastic and easier to handle.

In the emergency facing the world it would seem that the rapid construction possible, the fact that concrete ships are waterproof, that wood-boring worms cannot attack the hull, that concrete ships require practically no maintenance, that construction methods are economical and that cost is low, that concrete ships will not rust, caulking is unnecessary, materials for building may be obtained cheaply and anywhere, less labor and cheaper labor may be employed in construction; because there is no "skin friction", because such vessels may be floated before completion, because they are lighter than those of wood of similar size and tonnage-carrying capacity, because barnacles and sea growths find conditions most unfavorable, the Shipping Board can scarcely avoid giving the most serious and painstaking attention to every claim made for the concrete ship.

SEATTLE COMMERCE REPORT IS SUSPENDED

Following instructions recently received from the Collector of Customs, Puget Sound District, Mr. A. A. Paysee, Seattle Port Warden, has discontinued his monthly reports showing the commerce of Seattle harbor. These reports were very useful and will be missed by many firms, but when the ban on their publication is again raised, a complete file covering the suspended period will be supplied to those who have been favored with this valuable document in the past.

The "War Baron" recently completed at the yards of the Northwest Steel Company and built jointly by that concern and the Willamette Iron & Steel Company is Portland's finest contribution to the ocean-going mercantile fleets of the world.

Our Pacific Northwest

AMONG the new industrial conditions arising through the conditions thrust upon this country by the European war, conditions which have been accentuated by our own entry into the mighty world struggle, none have been more remarkable or have demanded more attention than the revival of wooden shipbuilding in the Pacific Northwest and the wonderful expansion of steel vessel construction in the same region.

That any inflated demand for wooden hulls would have a marked effect upon the shipbuilding industry of the Northwest goes without saying, as no section of our country is more favorably situated in regard to the supplies of raw material. Rivers, bays, sounds and waterways traversing country covered with the heaviest timber in the world mark this part of our national domain as the natural birthplace of the large wooden vessel, and while unprecedented demand has created a certain shortage in skilled labor, the Northwest is now, and probably will remain for all time, the premier producing section of the world when it comes to the ship with the wooden walls.

While it was to be naturally expected that the wooden shipbuilding revival that has swept the United States and Canada would make itself most powerfully felt in a section of our country so peculiarly adapted to the wooden shipbuilder's art and calling, the magnitude attained by the steel shipbuilding industry in this same section is indeed startling in view of the fact that the Pacific Coast labors under certain disadvantages as compared to the Eastern part of the United States as a steel shipbuilding field.

Here in the West we have been removed thousands of miles from the source of steel ship material, a handicap which has been offset to some extent by better climatic conditions under which to perform work. Despite the distance from the great steel mills of the country and the sources of iron ore at present being extensively worked, steel shipbuilding has enjoyed a most remarkable expansion on the Pacific Coast during the past two years, and in no section has this growth been more pronounced than in the Puget Sound and Columbia River districts.

The Portland District

In the Portland, or Columbia River, district we find the Albina Engine & Machine Works with five building-ways, the Northwest Steel Company with four ways, and the Columbia River Shipbuilding Corporation with three ways; a total of twelve building berths for steel ships. The Northwest Steel Company is to build an additional set of ways, and its neighboring yard, the Columbia River Shipbuilding Corporation, is shortly to install three more ways, doubling its capacity and giving Portland a total of sixteen ways for steel vessels. This capacity for laying down work should eventually enable the port to turn out four ships a month, figuring a steel hull to occupy a set of ways for 120 days.

In the matter of building-ways for wooden construction, the State of Oregon, including the yards on the northern bank of the Northwest's great interior water artery, these naturally belonging to the Columbia River district, is very strongly represented. Within the confines of this territory we have Kruse & Banks, of North Bend, with four ways; C. A. Smith, of Marshfield, with two ways; the McEachern Ship Company, of Astoria, with seven ways; Wilson Brothers, of Astoria, with four ways; the St. Helens Shipbuilding Company, of St. Helens, with five ways; the Standifer-Clarkson Company, of North Portland, with four ways; the Standifer Construction Company, of Vancouver, Washington, with six ways; the Columbia Engineering Works, of Linnton, with five ways; the Peninsula Shipbuilding Company, of Portland, with four ways; Kiernan & Kern, of Portland, with two ways; the Coast Shipbuilding Company, of Portland, with four ways; Supple & Ballin, of Portland, with four ways; and Grant-Smith, of St. Johns, with eight ways. This gives a total of fifty-nine ways now in active use. In addition to the building berths enumerated above, the Foundation Company of New York is putting in ten building-ways in its Portland shipyard, and Somarstrom Brothers are installing four ways at Columbia City. This gives a grand total of seventy-three building-ways in the Oregon and Columbia River districts without taking into account the plans of the yards enumerated for increasing their

One of the best known wooden shipbuilding establishments on the Columbia River Basin is that of the McEachern Ship Company, now owned by Mr. Max Houser, at Astoria, Oregon.

present building capacity or including new yards which intend to start operations in the near future. If we figure that each wooden ship will occupy a set of ways for eight months, we have a possible output of two large wooden vessels pet week from this territory.

Portland's Steel Plants

Two of Portland's steel shipbuilding establishments are located directly on the city's waterfront and immediately adoining each other. These two yards, the Northwest Steel Company's plant and the Columbia River Shipbuilding Corporation, have much in common and will be found to be working along practically the same lines. The Northwest Steel Company does a great deal of fabricating work for other Northwestern shipyards as well as turning out structural steel work for buildings and bridges, the steel work for the fine new inter-state bridge over the Columbia river having been fabricated in the shops of this concern.

During the writer's visit to Portland, the Northwest Steel Company launched one of a number of 8800-ton freighters they have under construction—the "War Viceroy." The launching was successful in every way, the vessel being brought up in the rather narrow channel by means of stoppers formed by lashings on heavy hawsers. These lashings were placed about two feet apart on each side of the vessel and had a breaking strain of one ton each, thus providing a ton break for each foot of progress after the vessel was off the ways. Chain drags and heavy anchors were provided as a further precaution against the vessel overrunning the width of the river channel.

The contracts on hand at the Northwest Steel are being handled jointly by this concern and the Willamette Iron & Steel Works, the latter plant furnishing machinery and boilers. Four 8800-ton freighters are being constructed at one time, a new keel having already been laid in the berth vacated by the "War Viceroy." These four building-ways should enable the Northwest Steel Company to launch a large vessel once a month, and the equipment of the plate shop and the ability to secure boilers, deck machinery and engines through the Willamette Iron & Steel Works as well as in their own shops permits of a very even progress toward the final completion of contracts.

The "War Viceroy" had attained an unusually high percentage of completion at the time of her launching. This fact arose through the prevention of an earlier launching by high water in the river. At one time the surface of the water was up to the keel plate amidships, and this condition greatly retarded certain worrk. It would seem from casual observation that it would be worth while to cofferdam the water ends of the ways, since the high-water periods are prolonged enough to seriously retard work.

The now familiar overhead trolley system of handling plates and shapes over building berths is in evidence at all three of Portland's steel shipyards. This system has been brought to a very high state of perfection and is by no means to be regarded as a makeshift or even as a cheap installation. The cost of equipping several ways with the heavy wire hawsers alone runs into a very handsome figure. As the trolley and hoist rig permits of wide variation in detail, the design of handling apparatus varies at the different yards. However, the system has proven highly successful, and most of the Northwestern shipbuilders are of the opinion that its advantages more than offset its limitations.

At the Columbia River Shipbuilding Corporation a splendid new boiler-shop was being equipped with heavy machinery and actual boilermaking had just begun. The writer here found a shop 275 feet in length by 132 feet wide receiving some fine boilermaking tools. The final completion of the outfit of this shop will give the Columbia River Shipbuilding Corporation as fine a boilermaking plant as exists on the Pacific Coast.

In this plant the shipshed, with punches, rolls, shears, etc., lies parallel with the ways, and as it is the intention shortly to install three more sets of ways, the yard will then have three sets of ways on each side of the ship tool-shop. Careful utilization of available space marks the layout of these two adjoining shipyards, and there is no lost motion in handling the steel material from the spur tracks, where it is received, to the steel storage space and thence through the shops and finally into place on board ship.

While all shipyards are more or less the same, and a description of one will come very close to answering for a description of another, there is one point about these two neighboring Portland yards that cannot fail but impress a visitor, and that is the youthfulness of the workmen. This feature of shipbuilding on the Pacific Coast is perhaps more marked at Portland than in the San Francisco Bay or the Puget Sound districts. Young lads are the rule in the mould loft and the shops, and there is a noticeable oversupply of hands on certain parts of the work. This does not mean that the yards have all the workmen they could profitably use in every department of their works, but that three men are very frequently seen doing a job that we would find two or even one man doing in one of the older yards. In short, these plants are building up a force by educating structural steelworkers up to shipfitters or shipsmiths, millworkers to be ship carpenters and joiners, etc. These men, many of them merely boys, are taking hold of the steel shipbuilding game in splendid style, and the method of working them is increasing the number of first-class skilled hands at a rapid rate.

In charge of the draughting room at the Columbia River Shipbuilding Corporation we found Mr. William Shaw, whom many of our readers will remember at the Union Iron Works, San Francisco, and under him was working the youngest draughting-room force the writer has ever seen in a shipyard. It is with such material as this that Portland is designing and building ships, and it is this human material that holds forth the greatest promise for the permanence of steel shipbuilding in the Portland district, since its efficiency and usefulness will continually increase and since practically the entire force will have been brought up under and trained to Portland shipyard methods.

Portland's third steel yard, the Albina Engine & Machine Works, Inc., is also a splendidly equipped yard that has undertaken the construction of a fleet of vessels of considerably smaller dimensions than the craft building at the other two plants. These vessels are 300 feet in length and are to be powered with triple-expansion engines of 1400 horsepower. The Albina plant has five building berths and a complete layout of well equipped shops. Here, as in the other yards, the overhead trolley is used to handle material over the building berths. Mr. William Cornfoot, who has had considerable experience in handling large repair jobs on damaged steel vessels, is in actual charge of construction work at the Albina plant, and under his guidance work is progressing rapidly on the first batch of steel hulls at present on the ways.

The yard of the McEachern Ship Company is completely planked over and presents a most pleasing picture owing to the absence of dirt and dust.

While steel shipbuilding on a large scale at Portland is a new industry, the impress of the original Pacific Coast shipbuilding firms is strongly felt. Wherever one goes throughout the Northwest, old Union Iron Works men or former employees of the Seattle Construction and Dry Dock Company will be found. This is particularly true in the case of the Union Iron Works, which might well be termed the original school of steel shipbuilding on the Pacific Coast. Mr. John Murray, in actual charge of shipbuilding operations at the Northwest Steel Company, and Mr. Jim McKinlay, in a similar capacity at the Columbia River Shipbuilding Corporation, both received a large measure of their training at the Union Iron Works, and there is a noticeable sprinkling among the foremen and superintendents from the same source.

No resume of steel shipbuilding activities in the Columbia River district would be complete without due mention of the Willamette Iron & Steel Works. This long-established Portland concern for many years has built marine boilers and handled some large marine repair jobs, more as an adjunct than as its main line of work. The great demand for boilers and machinery arising through greatly extended shipbuilding programmes has changed all this, however, and today the Willamette Iron & Steel Works finds itself with capacity orders booked for many months ahead. No less than sixty-four large marine Scotch boilers are now on order from this plant, which has been forced to extend its shops until at the present time they cover a great percentage of the total ground area of the plant.

The Willamette Iron & Steel Works has probably the finest equipped set of boiler-shops on the Pacific Coast, and its long record of high-class workmanship, the very large and difficult repair jobs which it has successfully negotiated in conjunction with the Oregon Dry Dock Company, and the present marine work it is accomplishing along with the Northwest Steel Company entitle this concern to a very high place among the leading steelworking establishments of the Pacific Coast.

An Interesting Design

In the Supple & Ballin yard the writer found two wooden hulls well along toward readiness for launching. These hulls, built on the new Ballin system, are perhaps the most interesting wooden shipbuilding development to be seen in the Northwest today. The demand for larger and larger wooden hulls and the desire to build these hulls in a manner that would preclude all chances of hogging, has resulted in the adoption of several important departures from the usual type of large wooden ship, and of these departures none is more interesting or holds a higher promise than the steel reinforcing system as designed and perfected by Mr. Fred A. Ballin and Mr. J. B. C. Lockwood.

These vessels were diagonally planked and had their inner and outer steel bulwark plates and their steel deck stringers in place. The steel diagonals over the deck beams and connecting the two deck stringers were also in place, thus giving an excellent idea of the appearance of the finished ship. One cannot examine these vessels without being forced to the conclusion that there will be no kinks develop in their shear line, as in addition to the steel topside construction the hulls have been exceptionally fastened throughout, the builders being guided thoroughly by the axiom that a wooden hull is no stronger than its fastenings.

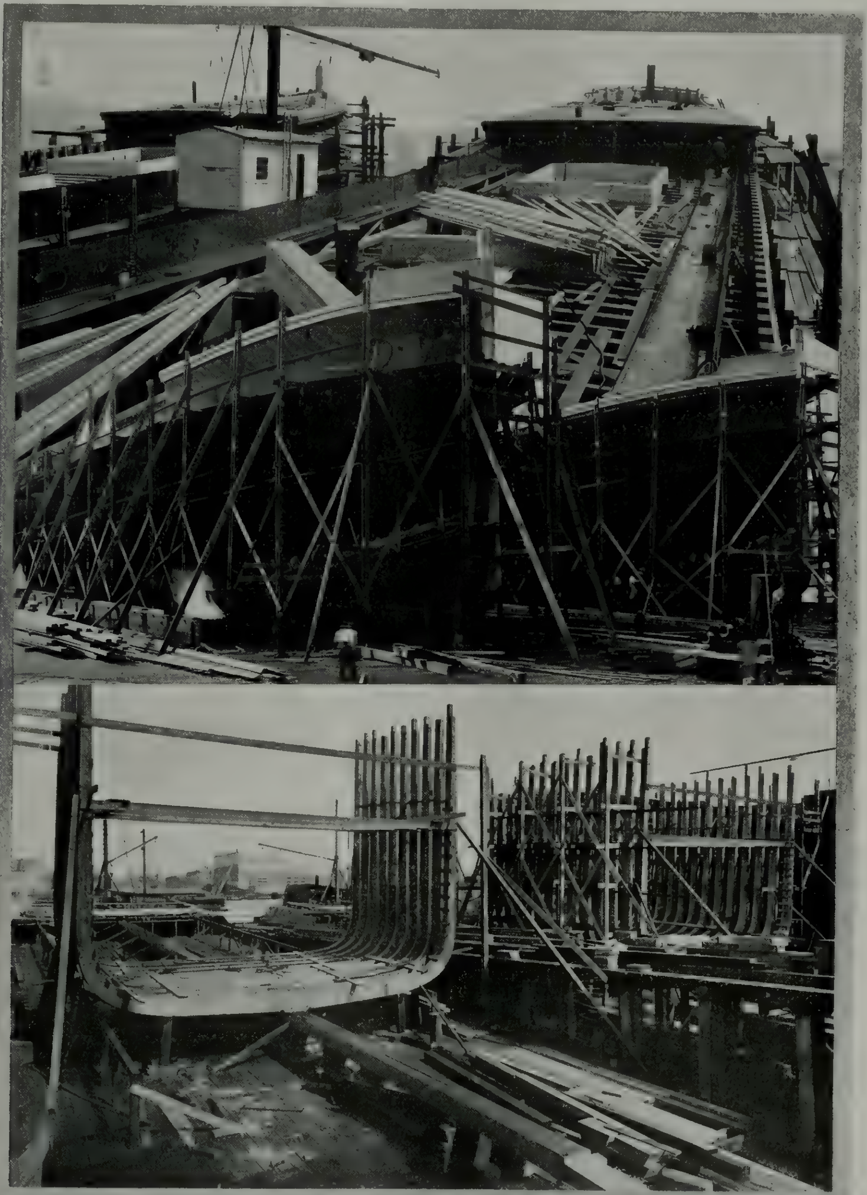
In the Ballin system a steel bulwark plate is carried practically the full length fore and aft and a similar inner bulwark plate together with a deck stringer and a covering plate connecting the outer and inner bulwark plates form the top chord of the truss formed by the vessel's hull, and since the strength of a vessel depends on the depth of her structure considered as a girder taken in connection with her length, the steel in the Ballin design is in the place where it will accomplish the greatest result.

For the accompanying sketches and description we are indebted to the data in the patent papers on the Ballin system. Figure 1 represents a cross-section of a ship with the steel topside construction, and Figure 2 is a detail view of the top girder chord. In these sketches, A represents the top plate of chord; B, the outside bulwark plate; C, the inside bulwark plate; D, the deck stringer; E, connecting angles; F, bottom angle on B; G, waterway angle; H, deck diagonals; I, wooden diagonal planking; J, wooden fore and aft planking; K, top timbers of frames; L, deck beams M, screw bolts through top timbers, and N, the wood cap on top timbers.

In constructing a vessel under the Ballin system the framing is the same as in an ordinary wooden ship. The top timbers of the frames, K, are left projecting to the desired height of bulwark above the deck and cut off to receive the wooden cap stringer N which is bolted to the ends of the top timbers.

The wooden diagonal planking is then put on, fastened to the cap stringer N and to every frame as desired. This diagonal planking is applied either single or double, and when double the planks cross each other at right angles.

The outside bulwark plate B is then erected on a scaffolding opposite its intended position, the plates being butt-strapped together, angles E and F riveted on the top and bottom edges, and the inner surface of plate B covered with some adhesive material which will afford an efficient binder between plate and diagonals when they are fastened together by the short bolts M, which are located between frame spaces. The deck stringer D is then laid down on the deck beams, riveted at butts or laps and to angles E and G, and kept far enough away from the top timbers K so that angles E can be riveted to the inner bulwark plate.

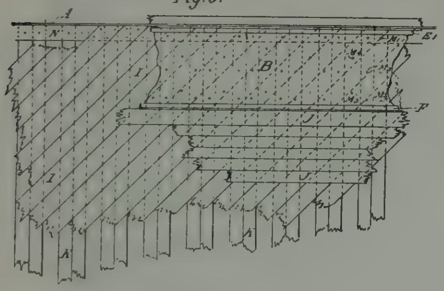


The upper picture shows the steel top-side girder on the Ballin ships, and it will be noted that the space between the inner and outer bulwark plates is left exposed until the very last to allow the wood to properly season. The view below this shows the diagonal planking and the outer steel bulwark or shear strake. The lower picture shows frames going in place for two Government vessels.

The plates C and D are then slid into position against the top timbers and fastened by the through bolts M to the outside bulwark plate B, the bolts passing through the top timbers. The hull of the vessel is then planked, decked, finished and launched in order to afford the woodwork between the bulwark plates ample time to season before the top plate A is riveted in place. Before this is done, the bolts M are set up tight to take up any shrinkage, and as the nuts of these bolts are always exposed, any further shrinkage can be taken up after the vessel is in commission.

It is, of course, essential to obtain a good contact between the steel topsides and the wood construction and to maintain this contact at all times after the vessel is in commission. To accomplish this, bolts have to be used in sufficient quantities and an efficient wood and iron binder applied to the contacting surfaces. By connecting on each side of the vessel the inner bulwark plates C to the horizontal deck stringers D, to which in turn the deck beams L are bolted, the ends of the deck beams can be firmly held against the top timbers of frames by means of the bolts M. Setting up on these bolts, in case of shrinkage in the top timbers, the bulwark plate C will follow the deck stringer and thereby tighten the contact between the top timbers and the end of the deck beams.

Fig. 3.



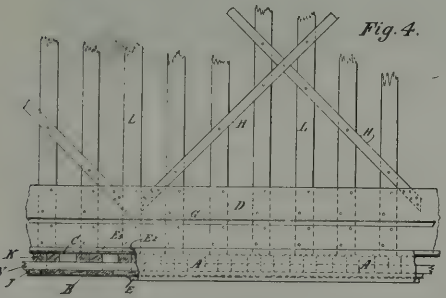
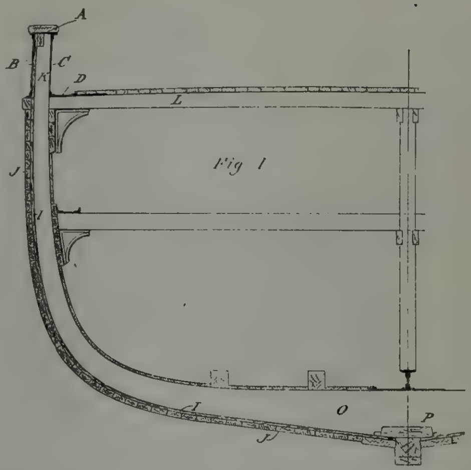


Fig. 4.

The introduction of the metal straps H, riveted to the deck stringer on each side of the ship, and crossing each other on top of the deck beams at about right angles, complete the trussed construction of the deck frame, in which construction the girders BAC are the top and bottom chords, the deck beams the compression or strut members and the diagonal straps the trussing members. Under strain, these ties, lying on the top or convex side of the cambered deck beams, will naturally tend to tighten. It will thus be seen that the box girders BAC form the tension and compression chords both for horizontal and vertical strains to which the vessel may be subjected.



Scuppers are taken care of by cased-in openings through the girder formed by the inner and outer bulwark plates. These ships are extremely well fastened, this being specially true of the through bolting used in building up the frames.

Mr. Fred A. Ballin has brought an extremely varied experience both in wood and steel shipbuilding to the firm of Supple & Ballin, and has always been a very close observer of the many constructions in which wood and iron have been used jointly in ship construction. This shipbuilding experience coupled with his knowledge of marine engineering makes Mr. Ballin, in conjunction with an experienced wooden shipbuilder like Mr. Supple, a splendid working combination for the purpose of getting the very best out of the steel reinforcing of wooden hulls.

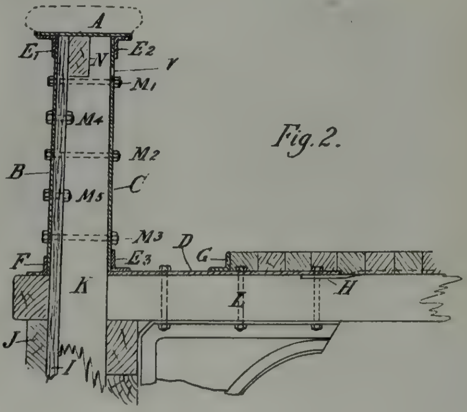
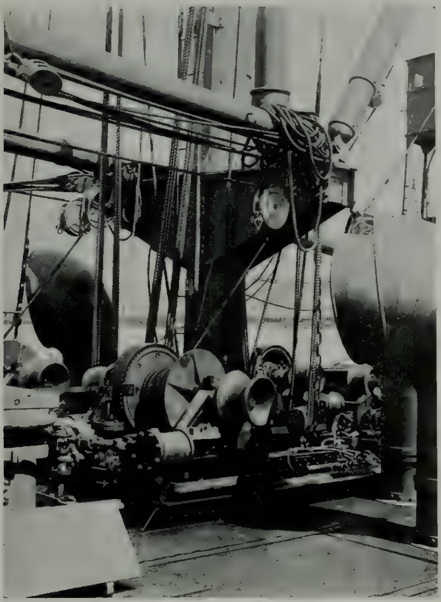


Fig. 2.



Deck winches on board the "War Baron." These winches were manufactured by the Willamette Iron & Steel Co.

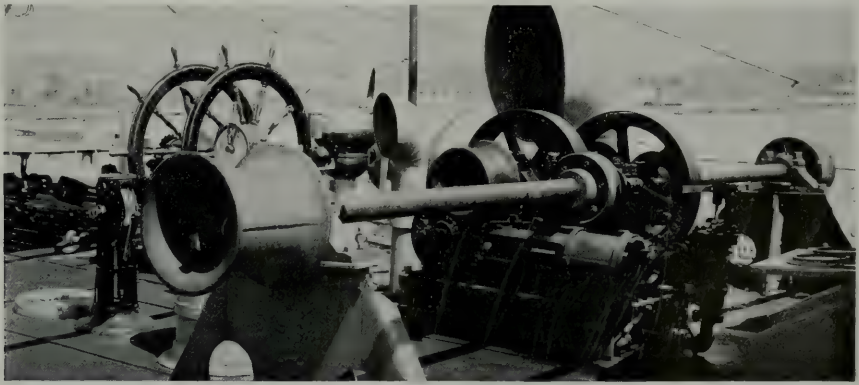
The Supple & Ballin plant is building a number of vessels of about 4000 tons deadweight capacity for the Government, and it is generally expected that these vessels will fulfill the highest expectations of their designers. This shipyard is well laid out both for working in wood and extensively enough to handle the steel construction that is embodied in these boats.

Other Wooden Yards

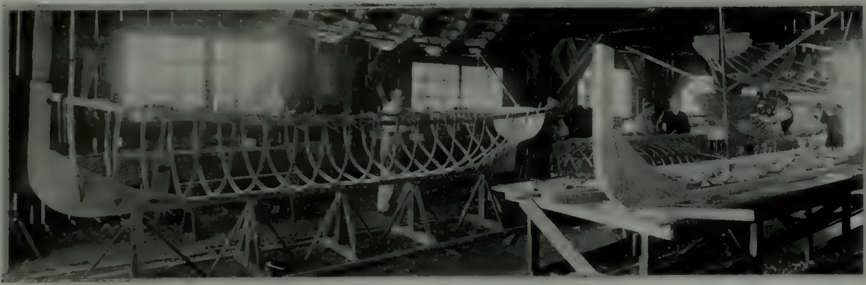
We have already enumerated some of the principal wooden shipyards along the Columbia River and in other Oregon centers of the industry. Wooden shipbuilding plants have been thinly scattered up and down the Pacific Coast for many years, and these yards, many of them, had checkered careers owing to the lack of continuity of work. While these yards suffered from concurrent periods of dull times, however, the work which they turned out when they did get a ship to build was of the highest class, and every Westerner who is interested in the sea has every cause to feel proud of the products of our early shipbuilding establishments. The wooden shipbuilding firms of the Pacific Coast have a splendid past to be sustained, and it is with pleasure that one realizes that the great majority of the yards, both old and new, are living up to the standards of material and workmanship set by the builders whose staunch craft continually proved false the idea that a wooden ship was shortlived.

If there is any fault to be found with the great fleet of auxiliary vessels that has been and is now building in the Pacific Northwest, that fault, in our opinion, lies in the fact that many of the craft are underpowered and that the installation of twin screws and the desire to get the engines as far aft as possible has resulted in carrying the full body of the ship so far aft as to detract somewhat from the quality of the boats as sailers. It is our belief that the next development in this type of craft will be the gearing of Diesel or hot-bulb engines onto a single shaft for a large low-speed propeller and the subordination of the sails to a distinctly second place as motive power. This is a matter which should keenly interest the wooden shipbuilder, as it is the economical trade value of the wooden auxiliary vessel that will determine the continuance of the demand for these craft when the tonnage shortage begins to be overcome.

To say that there is no shortage in ship carpenters would be futile, but the Columbia River district, like our other shipbuilding sections, is overcoming this condition by breaking in mill and house carpenters to the work and also by adopting the



Deck machinery has become a very important item at the plant of the Willamette Iron & Steel Works. This plant, like others in the Northwest, is working at full capacity.



Boatshop at Vancouver, Washington. Several boatbuilding establishments have sprung up in the Northwest since the start of the shipbuilding boom.

latest woodworking tools and labor-saving devices.

In such a rapid development of any industry as has happened in the wooden shipbuilding field in the Northwest during the past two years, there are bound to be mistakes of judgment, and several firms with insuffcient capital or without either organization or the slightest shipbuilding ability have been started as stock-selling concerns and then dwindled out. Fortunately, the number of such schemes has remained comparatively small, but considerable harm has been done by their temporary presence to bona fide shipyard propositions that have been offered to the public. A great many people have been deluded into believing that enormous profits were to be secured through shipbuilding concerns. The shipyard of today has been contracting on a steadily rising market, and while the plant that is thoroughly organized and is possessed of a good personnel and good tools may be making a good profit on the investment, there are yards, on the other hand, which are being regarded with envy by the uninitiated and yet are probably losing money. In short, shipbuilding today, despite the high prices being paid for tonnage, is a business that should only be entered upon by experienced people. The present number of wooden yards on the Pacific Coast will probably have to be curtailed in not so many years, and in order to be on the safe side a concern has to very promptly write off its original plant investment.

Machinery Plants

Shipbuilding activities along the Columbia have made themselves keenly felt in Portland's industrial life and several of the machine-shops in that city have expanded rapidly to meet the growing demand. The Hesse-Martin Iron Works is handling the auxiliary machinery for ten ships, and in addition has gotten out some excellent shipyard tools, notably a well designed pneumatic bolt header which has found an extensive use in Northwest shipyards. The Helser & Unden Machine Works is also entering extensively into the marine field, holding an order from one shipbuilding firm alone for fifty-five ship winches.

In this manner the shipbuilding activities around Portland are speeding up production along many lines. The marine supply houses, machine-shops, foundries, and allied concerns are all operating at full blast, and the business effect upon the city has been very marked.

Portland's steel yards and a goodly number of the wooden shipbuilding plants have all the earmarks of permanence. Installations have been made on a liberal scale, and plant layouts have been arranged with a view to ultimate expansion. Just what effect on the industry the commandeering of all large tonnage by the Government will have remains to be seen. Temporarily, at least, it seems that a hardship will be worked on some of the yards. In the case where firms have been doing work for foreign owners it will doubtless take considerable time to adjudicate the monetary feature of the contracts. In cases where payments are due on vessels under construction, the original owners will naturally hold back payment until their exact status is definitely established by the Government, and, on the other hand, the United States will probably take quite a while to determine just what is due the shipbuilder.

Co-operation

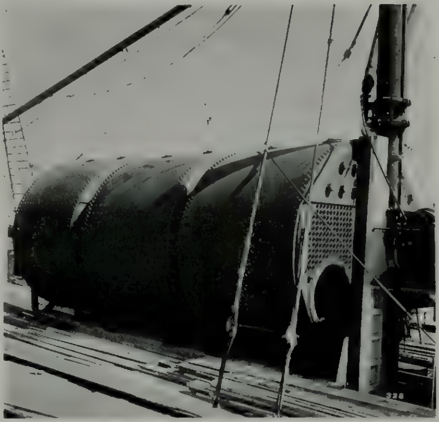
The shipbuilders in the Columbia River field are working together in close harmony for the interest of the industry. In this get-together movement, both the wooden and the steel yards are participating with equal good will. With the view of expediting work and taking concerted action on the raw material problems which are continually arising, the Columbia River Shipbuilding Association has been formed. This body has selected the following Board of Managers: Mr. H. E. Pennell, of the Coast Shipbuilding Company (wood); Mr. Max Houser, who recently purchased the McEachern Ship Company plant (wood) at Astoria; Mr. William Cornfoot, of the Albina Engine & Machine Works (steel); Mr. Jos. Bowles, of the Northwest Steel Works; Mr. Fred A. Ballin, of Supple & Ballin (wood), and Mr. F. C. Knapp, of the Peninsula Shipbuilding Company.

One of the most serious problems confronting the yards holding Government contracts is the difficulty of avoiding those delays which are almost inevitable in government work where a certain routine of inspection and reports has to be strictly adhered to. It will be the endeavor of the Portland builders to have such government routine as is unnecessary removed, with the end in view that government contracts will be subject to as little delay as possible.

The Work of the Port

In the July issue of the Pacific Marine Review we had occasion to comment upon the splendid results obtained upon the Columbia River bar. So successful has been the result of the jetty work, coupled with the dredging carried out by the port of Portland and the national government, that Portland is now accessible to the largest vessels plying the Pacific.

A law was passed in the Oregon Legislature some time ago allowing the Port of Portland to sell bonds to the amount of about $1,000,000 for the purpose of establishing a Port-of-Portland owned ship line to the east coast of the United States. Whatever the wisdom of such a proposition may be, and of course this is a debatable matter, the creation of such a measure shows that the people of Portland and the State of Oregon are thoroughly impressed with the importance of water-borne commerce. Portland is the natural gateway for a great inland empire which possesses the double advantage of rail and water routes to its outlet. The development of Portland's tributary territory has been going on for quite a few years, but as yet its ultimate possibilities have hardly been touched. In short, Portland has a splendid future before her as a seaport, and her people are thoroughly awake to the possibilities of the situation. The deepening of the Columbia River channels, the practical elimination of the river bar—since a port with forty feet of water in the entrance at mean low tide can hardly be termed a bar port—and the determination of her people to make their port a heavy factor in the commerce of the Pacific all point to an early fulfillment of the hopes of Portland's people. Splendid municipal docks built from the designs of Mr. G. B. Hegardt, C.E., well equipped shipyards, boiler works, and drydocks, all of these Portland now has and we may confidently look for a large and steady increase in her ocean-borne commerce from now on.



A battery of Willamette Iron & Steel Company's boilers stowed on board a coasting vessel for transportation south.

PLANT NOW COMPLETED

The splendidly equipped plant of the Pacific Marine Iron Works at Portland, Oregon, is now ready for operation. The concern will devote its energies primarily to the production of triple-expansion engines for the ships of the emergency fleet. The Pacific Marine Iron Works has already booked orders for sixteen large steam-engines and some fifty Ballin water-tube boilers.

Portland's latest engine and boiler building concern is capitalized at $125,000, and Mr. Fred A. Ballin, of Supple & Ballin, is President, and Mr. J. L. Jennings is Secretary and General Manager. Mr. Jennings up till one month ago was General Superintendent of the Seattle Construction & Drydock Co., resigning that position to take up his work with the new concern.

The plant of the Pacific Marine Iron Works extends over an area of about two and one-half acres in the heart of the city's waterfront. The main shop building will have a length of 300 feet and a width of 90 feet, and the entire plant is being fitted with heavy modern tools and overhead handling equipment.

Work progressing on the site of the Coast Shipbuilding Company's plant at Portland, Oregon.

On Puget Sound

SHIPBUILDING and its allied industries have nowhere received a greater impetus than in the Puget Sound region, and this is especially true of steel shipbuilding. This district has come to the front with giant strides in the matter of seaborne commerce, and this movement in conjunction with the great industrial development has had its counterpart in British Columbia, which promises a splendid development in shipbuilding.

Puget Sound, like San Francisco, had its pioneer builder of steel vessels, and just as in the case of the Union Iron Works on San Francisco bay, Robert Moran and later the Seattle Construction & Drydock Company, was the only plant undertaking large steel construction for many years.

The Puget Sound region enjoys splendid steamship service to the Orient, South America and in a certain measure to Europe, although the latter route has been practically free of shipping for some time. A splendid export trade has been built up between the Sound ports and Vladivostok, and the springing up of the steel shipbuilding industry places Seattle and her sister cities in a very advantageous position as regards not only the repairing of the ocean vessels that visit the Sound, but also in the ability to augment and increase her foreign commerce fleets.

The "Anyox" on the ways at the yard of the Winslow Marine Railway & Shipbuilding Co. This much discussed and highly commended craft is now ready to go into commission.

As a wooden shipbuilding center, the Sound presents every advantage. Unlimited waterfrontage suitable for shipyard use, inexhaustible supplies of excellent ship timber immediately at hand and a lesser degree of shortage in the labor market than had been anticipated, all unite to make this section a natural choice for this industry.

On Puget Sound there are seven steel yards either under operation or in course of construction, the Seattle Construction & Drydock Company, the Ames Shipbuilding and Drydock Company, the Anderson Shipbuilding Corporation, the Erickson Shipbuilding Company, the Skinner & Eddy Corporation, the Washington Shipbuilding Company, the Todd Shipbuilding Company, and J. F. Duthie & Co., while in adjacent British Columbia waters are found the Wallace Shipyards, Ltd., building in both steel and wood, J. Coughland & Sons and Yarrows, Ltd., the latter concern specializing in small light-draft steel river craft and repair work. This gives over thirty ways for large steel vessels, or an ultimate capacity of over ninety large vessels yearly, providing the supply of material holds out and sufficient labor can be found to work up the steel.

Wooden shipbuilding on Puget Sound and adjacent Canadian waters is represented by about forty companies, one-half of which number are actually engaged in building ships, while the others are installing plants or, in some instances, are stock companies which have not yet started operations. In additions to this array of yards, actual and prospective, the State of Washington boasts several other shipbuilding centers of lesser magnitude along her Pacific shore line. Aberdeen, Hoquiam, and Grays Harbor yards form quite an appreciable factor in Pacific Coast shipbuilding circles, and at these points some of the oldest and best known shipyards on the Coast have been established for a good many years. To the casual observer it would seem that the wooden shipbuilding necessities of the Coast are well looked after.

THE ORIGINAL STEEL YARD

The Seattle Construction & Drydock Company is situated in the heart of Seattle's waterfront and is still, perhaps, the most comprehensive yard on Puget Sound, since engines are constructed here as well as hulls, and drydocks are maintained, the concern enjoying an extensive repair business as well as undertaking new construction. The plant is at present under the able guidance of Mr. C. W. Wiley and his assistant, Mr. J. E. Sheedy, who until a few months ago was Superintendent of the Inter-Island Steam Navigation Company at Honolulu.

During the writer's visit to this plant, two very interesting repair jobs were under way: One the conversion of the old cruiser "Boston" into a freighter, and the other the rebuilding of the big Coasting steamer "Congress." All the upper works had been removed from the "Boston" and were being replaced by a much lighter and more serviceable superstructure. The "Congress" was undergoing a rather slow process of change, it being necessary to take out, straighten or renew and replace one deck at a time. Her new accommodation plans indicate that she will be one of the most popular passenger boats in the trans-Pacific run. The vessel, with the exception of engines and boilers, will have been practically rebuilt when she is once more ready for service. Mr. Benny Martland, one of the best known marine engineers on the Coast, is looking after the rebuilding of this vessel for her owners.

The plant of the original Seattle Construction & Drydock Company has undergone many alterations and additions since its control passed over to the Todd interests. The overhead trolley system of handling ship material, now so popular in the Northwestern yards, is in use, new machinery has been installed, new building-ways laid down, and the entire yard has been brought thoroughly up to date. Naval work as well as merchant work is under way at this plant, and with the able management now in control of its destinies, the Seattle Construction & Drydock Company should develop into one of the greatest shipbuilding concerns in the United States.

A scarphing machine designed at the Skinner & Eddy yard in Seattle and now extensively used in the Northwest.

THE STEEL SHIPBUILDERS

Two of Seattle's plants, those of the Skinner & Eddy Corporation and of J. F. Duthie & Co., are doubly important in the sense that they represent two stories of splendid human achievement as well as two important cogs in the wheels that are turning out the great fleet which the United States has tardily decided that it is altogether necessary for her to have.

Messrs. Skinner & Eddy, who control the Port Blakely Mills and other great properties, found it necessary to have ships, but the condition of the ship market and the shipbuilding industry was such that they could neither buy tonnage or have it built. Boldly they decided to start a shipyard and their record of converting a waste swamp into a shipyard, erecting buildings, installing machinery,

Sailing ships at one of Seattle's new municipal piers. The public improvements at this port are not all self-supporting as yet, but soon should be with the rapid growth of foreign trade.

Among the industries profiting by the shipbuilding expansion is that of the sheet metal worker. The illustration shows a "lighthouse" from the W. G. McPherson shops.

building up an organization and turning out five large steel steamers all in sixteen months is a truly remarkable one.

J. F. Duthie & Co. was evolved out of what was originally a small machine-shop, but Mr. Duthie had shown many times, in tackling great repair jobs, that he had the initiative and courage to go out after big things. It is not surprising, therefore, to find him taking a large and prominent part in Seatle's great shipbuilding development.

The Todd Shipbuilding Company, located at Tacoma, has a new plant well along toward completion. Owing to the large building programme contemplated by the Todd interests, it was decided that an additional yard to that of the Seattle Construction & Drydock Company would be necessary in order to finish all the contracts held within the time limits stipulated. With this end in a view, a tract of waterfront property was secured at Tacoma and the work of establishing a great shipbuilding plant was started. Every effort is being made to construct a shipyard at this point that will be second to none in the country in the way of equipment.

The Anderson Shipbuilding Corporation is undertaking smaller steel vessels, those on contract being of 3000 tons deadweight capacity. This plant is located on fresh water, being on Lake Washington and having access to the Sound through the new canal.

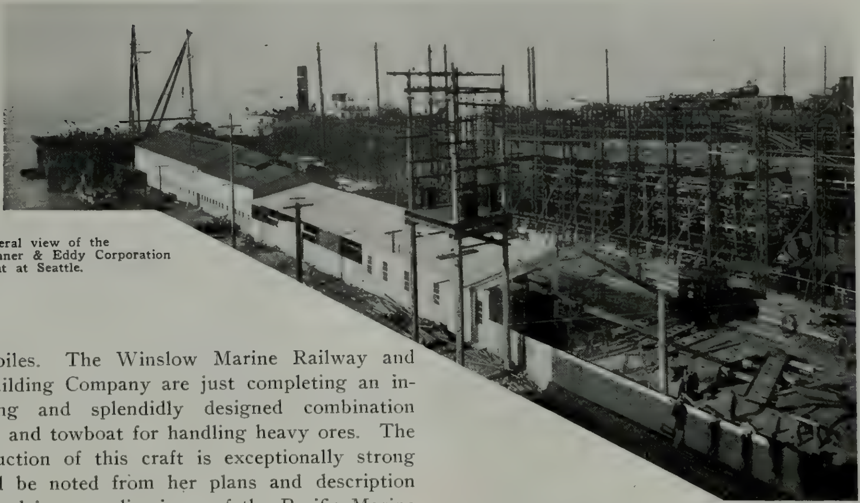
The other steel yards are rapidly getting into shape to start construction work on vessels for the United States Shipping Board, and their completion will mark the rise of Puget Sound to one of the most important steel shipbuilding centers in the country.

WOODEN SHIPBUILDING

Wooden yards on Puget Sound, the British Columbian and Vancouver shore lines, and the coast shipbuilding centers of the State of Washington are so numerous and are increasing so rapidly that individual mention of them in a short article would be impossible. A great number of auxiliary vessels powered with various types of internal combustion engines are still under construction as well as a great fleet of steam driven standard craft for the United States Shipping Board's Emergency Fleet Corporation.

Some of these yards are quite elaborate, as for instance that of the Sloan Shipyards Corporation at Olympia where six large vessels are on the ways and where the entire yard has been planked over, the planking resting on no less than seven thou-

The making of spars and masts has grown sufficiently to support several firms which specialize on this work. The above views were taken in the International Spar Company's plant, Seattle.



General view of the Skinner & Eddy Corporation plant at Seattle.

sand piles. The Winslow Marine Railway and Shipbuilding Company are just completing an interesting and splendidly designed combination freight and towboat for handling heavy ores. The construction of this craft is exceptionally strong as will be noted from her plans and description published in an earlier issue of the Pacific Marine Review.

At Grays Harbor the wooden shipbuilding industry has undergone a great revival. This revival was started by the advent to this territory of Mr. Andrew Peterson, one of the best known, ablest and most thoroughly respected wooden shipbuilders on the Pacific Coast. Mr. Peterson demonstrated that large hulls could be built on the Wishkah river and floated down to Grays Harbor. This river always has plenty of water for this purpose, but its channel is narrow and tortuous. Mr. Peterson moved to his new location from Raymond, Washington, and has since taken five large hulls down the river. This success followed hard upon the heels of many lean years at Raymond, is looked upon as a well deserved reward for a man who has done so much for the wooden ship on this Coast by always putting the very best that was in him in his work. Mr. Peterson has now sold his interests to the Grant Smith Corporation and is acting now as superintendent of the new concern's properties. The Grant Smith Company has secured more waterfront land and is expanding the yard in order to meet the requirements of the large contracts on hand. Almost immediately following the sale of the Peterson interests to the Grant Smith Company, the Schubachs of Seattle leased the Lindstrom yard which had been profitably operated by the late John Lindstrom. The new owners are enlarging and reequipping the plant for Government work. Adjoining the Schubach yard is the property of the Grays Harbor Motorship Company, these two plants occupying about 2000 feet of water frontage. The plant investment at Aberdeen is now well over $500,000 and it is estimated that the industry has added $75,000 monthly to the town's pay roll.

NEW PLANT AT OLD TACOMA

Babare Brothers have just completed one of the most conveniently arranged and best equipped shipyards of its size on the Coast. After the process of evolution from a boat yard to a ship yard, covering a period of six weeks, this firm is now laying keels for wooden steamers for the Government. The entire plant, where last winter sixty to seventy foot cannery tenders and seine boats were turned out in only twice as many days, has been entirely rebuilt.

Two three hundred foot building berths lie on either side of a new electric steel crane which operates on the elevated track shown in the accompanying view. This crane is equipped with a 70-foot boom and has a capacity for handling the largest timbers. The donkey derrick shown in one of the views with a newly laid keel in the foreground and the machine shop in the background, runs on a track extending to the end of the wharf where it is used to unload and hoist

The "Frances L. Skinner," one of the latest products of the Skinner & Eddy yard, on her trial trip.

Main shop at the Pacific Metal & Galvanizing plant, Seattle.

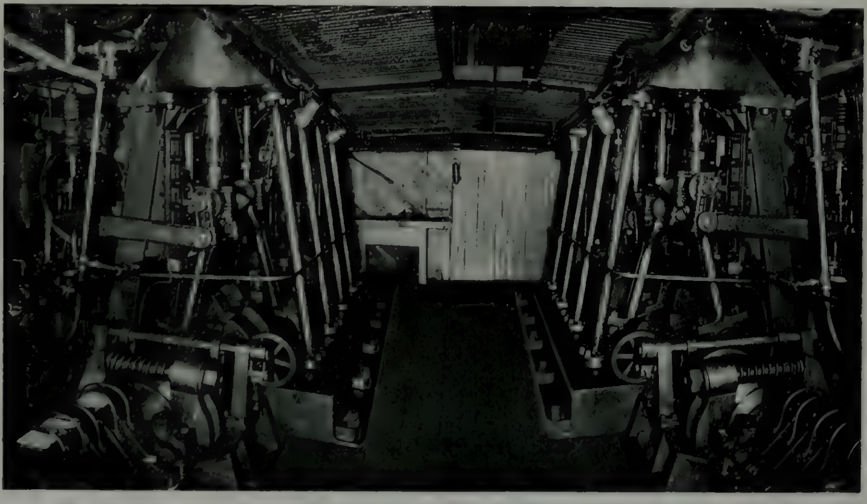
scow loads of lumber being shipped in to the plant.

At the inner end of this donkey-derrick track, is the main building with band saws and planers on the ground floor. The most modern wood working machinery has been installed throughout on this floor, the installation being a model of its kind. The second floor is also equipped with wood working machinery of a lighter nature and filing rooms. The third floor is fitted as a mould loft.

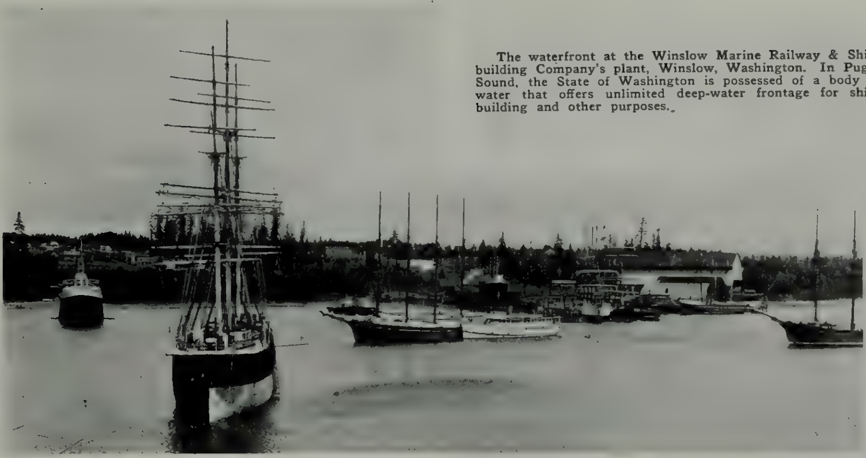
The machine shop is thoroughly equipped with lathes, drill-presses and all machinery necessary to take care of engine installations on the steamers that are being built. Under the elevated crane track is located a compressor house with two large air compressors. A highly interesting development in the Babare plant is the use of air for driving portable planers. These planers are an invention of Mr. George Babare. The machine was gotten out for the use of Babare Brothers but has proven so successful in use that quite a demand has arisen for them and the machine shop at Babare Brothers is busy turning them out for the use of other builders.

ALLIED INDUSTRIES

Naturally enough, with the vast amount of steel and wooden shipbuilding going on around Puget Sound, makers of machinery, supply houses and the many business enterprises that help in the building or outfitting of ships have all profited greatly by the new conditions. The Commercial Boiler Works of Seattle has more orders on hand than ever before in its history and has been compelled to greatly enlarge its facilities. Boat building plants have found that they are rushed to their capacity with the orders for ship boats coming on top of the usual demand for fishing craft. The Marine Pipe and Machine Works undertook to construct some Sumner internal combustion engines and now find that this work threatens to absorb all their energies so great is the demand for marine engines. Kilbourne & Clark are turning out wireless sets at a tremendous rate having the equipment of some three hundred ships to look after. The Pacific Ice Machine and Supply Company are having their hands full with the installation of numerous sets of refrigerating machinery. The Pacific Machine Shop and Supply Company have a large number of their electric winches on order, these machines having proven highly economical and serviceable. And so on down the list. New concerns are starting up which make a specialty of furnishing ship spars and this is true also of knees. New foundries for both steel and iron castings and at least one large forge shop owe



The engine-room of the motorship "Santino," stripped of ladders to show her Sumner Diesel engines. These engines rendered a splendid account of themselves on the long voyage from Puget Sound to Boston, and the makers of this Seattle product are highly gratified at the success attained.



The waterfront at the Winslow Marine Railway & Shipbuilding Company's plant, Winslow, Washington. In Puget Sound, the State of Washington is possessed of a body of water that offers unlimited deep-water frontage for shipbuilding and other purposes.

their existence to the shipbuilding program and the end is not yet in sight.

THE SHADY SIDE

There are those who question and it seems to us rightly question the wisdom of going on building new shipyards, and this is especially true of the wooden shipyards that practically spring into being upon receiving a Government order for four, six or eight hulls. Would it not be wise for these new concerns to consider carefully the fact that their present Government order may and probably will be their last chance of securing work from that source? Will the profit to be made out of their first batch of wooden ships enable them to return their entire investment and leave the shipyard as an unincumbered asset? It seems to us that this condition is practically necessary. Granting that through the present opportunity the wooden ship may attain and even hold a certain place in the world's merchant marine, it still remains that after the present crisis is over there will not be a sufficient demand to keep all of the wooden yards that have sprung up along the Pacific Coast busy. If these new yards have not succeeded through their Government contracts in wiping the first cost of their plant off their books, they will be in no condition to compete with the old established yards when competition becomes once more a factor in the industry.

The steel yards, we think, will be more favorably situated in regard to the future. Even with the turning loose of Great Britain and Germany's

Interior of one of the big wooden vessels building at the Sloan Shipyard, Olympia, Washington, and skidding one of the completed frames into place on the keel.

The hospital at the Ames Shipbuilding & Drydock Company. The shipyards of the Northwest pride themselves on their arrangements for the care of their workmen.

shipbuilding establishments after the war, the great demand for tonnage will probably continue for a period of years and the inevitable decline will come gradually, allowing the yards to cut their coats to fit their cloth.

However, these are matters for the future to decide, and the fact remains that the Puget Sound district will remain a great shipbuilding center for years to come and as no industry contributes to the general prosperity of communities in as great a measure as shipbuilding Seattle, Tacoma, and the other communities where shipbuilding exists will reap a splendid reward for which they should ever be grateful to the shipbuilder, who, whether he enriches himself to any great extent or not, is bound to enrich the community in which he operates.

No single event in Seattle's development during the past few years is of more significance than the opening of the Lake Washington Canal to traffic. This new waterway was fittingly opened on the Fourth of July and gives Seattle unlimited waterfrontage, a fresh as well as a salt water harbor, a new and well situated industrial area and the means of expansion in every phase of urban activity. The work was undertaken jointly by the City of Seattle, King county, and the federal government, and while the preliminary work in connection with the project was marked by vexatious delays, once the work was actually started it progressed steadily to completion. The canal has been described in previous issues of this magazine, and all that is necessary to say here is that the locks are capable of handling any ship now plying the Pacific. That the Lake Washington Canal is a good business investment is borne out by the use that has already been made of it—a use which will naturally and rapidly increase. From July 4, the opening date, to August 15, the traffic data for the canal reads as follows:

Boats of all kinds	2600
Passengers	11,000
Logs, board-feet	27,000,000
Lumber, board-feet	4,000,000
Spars and piles, lineal feet	300,000
Creosote, gallons	70,000
Miscellaneous oil, barrels	13,000
Miscellaneous freight, tons	13,000

A VALUABLE STEAMSHIP CONNECTION

Japanese steamship companies have played an extremely important part in the development of the great trade out of Puget Sound, a trade that

The Sloan Shipyards Corporation's plant at Olympia, Washington, is splendidly equipped, and situated on what is virtually an island, the yard being supported by no less than 7000 piles.

Three big wooden hulls under construction at the Ward plant Olympia, Washington. The capital city at the head of Puget Sound has become quite a wooden shipbuilding center.

has astonished the whole country during the past few years by its remarkable growth. In this connection, the most important steamship link with the Orient and from there on to the Indies and Europe is maintained by the Osaka Shosen Kaisha or the Osaka Mercantile Steamship Company, Ltd.

The story of the development of the fleet and business of the Osaka Shosen Kaisha furnishes one of the most remarkable examples of the many instances where Japanese capital, Japanese business acumen and above all a well developed Japanese public sentiment with reference to the value of ships have combined to build up great carrier lines whose world business is steadily contributing to the wealth and power of the Japanese nation.

The Osaka Shosen Kaisha was inaugurated in 1884 with a capital of $600,000, seven steamers and a service that covered less than a total of 8500 miles in sea routes. In 1893 it was found necessary to increase the capital to $900,000 and as the business began to expand rapidly successive increases in capital followed each other regularly, the last occurring in the present year when the capital stock was increased to $25,000,000. In 1901 the debentures stood at $2,250,000, in 1909 at $3,750,000 and in 1917 at $2,750,000. The last balance sheet issued by the company shows the remarkable financial soundness of this great steamship concern, but the expansion of the company's routes until they embraced all the great trade channels forms even a more fascinating story than that covering the concern's financial growth.

From 1884 to 1894 the business of the Osaka Shosen Kaisha was confined to the Inland Sea. To the services rendered in these waters was added a Japanese coasting service which was built up during the next five years. In 1899 the company began to branch out and between this date and 1903, steamship service was opened up between Japanese ports and China, Formosa and Korea. It was not until 1904, however, that the Osaka Shosen Kaisha reached out over the oceans and began to occupy an important place as one of the world's great ocean carrier concerns. In the fourth period of expansion, between the years 1904 and 1915, the North American line and the Bombay line were built up and developed. Following 1915 there was a still further expansion and the South Sea Line, the South American Line and the Australian Line came into existence. Even more pretentious ventures are included in the Osaka's plans for the near future when an European Line and a round-the-world service will truly mark this steamship company as one of the world's leading ocean enterprises.

Exclusive of launches and lighters and inclusive of steamers now under construction, the fleet of the Osaka Shosen Kaisha comprises 128 vessels of an aggregate tonnage of 318,350. In and about their home and adjacent waters 18 lines are operated in the home service, 5 lines in the coasting service, 8 lines in the Chinese service, 4 lines in

This display of ventilator cowls is an excellent illustration of what shipbuilding is doing for the smaller metal-working establishments in the Northwest.

A battery of boilers built by the Commercial Boiler Works of Seattle ready for shipment to California. The Northwestern boiler-makers have secured much business outside of their own shipbuilding districts.

the Korean service and 5 lines in the Formosan service.

In their North American service, the Tacoma Line, the Osaka Shosen Kaisha employs four 6000-ton and two 10,000-ton steamers regularly and at the present time, owing to the great demand for bottoms, from seven to eight extra 4000-ton steamers. These vessels connect the Puget Sound and British Columbia ports with Hongkong, Manila, Kobe, Yokkaichi, Shanghai, Nagasaki, Moji and Yokohama.

The South American service is handled by two 6000-ton steamers with six sailings a year from Tacoma and Seattle connecting with Yokohama, Kobe, Nagasaki, Hongkong, Singapore, Dueban, Cape Town, Buenos Aires and Rio de Janeiro.

The Australian service is a monthly one and is handled by two 3000-ton steamers connecting Hokodate, Yokohama and Kobe with Manila, Sydney, Melbourne and Adelaide.

As evidence of the remarkable growth of the business out of the Pacific Northwest ports, the Osaka Shosen Kaisha, despite the great size of its fleets, has been forced to go into the open market and charter vessels at the present high charter rates in order to handle the business offered and at the present time six of these chartered vessels are helping to take care of the business of the Tacoma line.

The part played by Japanese lines in the trans-Pacific carrying trade has been an all important one and the resulting benefits to Japan have repaid the government of the Island Empire a hundred fold for its wise decision to encourage the Japanese to seek a great and glorious future on the sea.

THE FUTURE OF AMERICAN STEEL SHIPBUILDING

Prophecy is a dangerous pastime and he who undertakes to outline the future of steel shipbuilding in America has set himself a well nigh impossible task. There are certain facts, however, which are obvious and the most potent factor among the changes which must come is the inevitable return to competition.

Before the war, American steel shipbuilding was almost entirely, we might well omit the "almost," to vessels for the American coastwise trade. We did not build for foreign nations for the simple reason that they could build cheaper for themselves. No American builder ever dreamed of furnishing a freighter for thirty dollars a deadweight ton and yet British builders have done it. It is true that this low figure was only obtainable in slack times from a few yards that were very hungry for work, but, nevertheless, this is a fact that has to be faced.

An ordinary steel freighter in the United States today can not be built much under $150 per deadweight ton. This price is, of course, abnormal. Neither Great Britain or Germany will ever be able in the future to build ships as cheaply as they have in the past. Both the cost of the steel material and the shipyard labor account will show

The J. F. Duthie & Co. plant is well laid out for the expeditious handling of steel material between shop and building-ways.

marked increases. But will not the same be true in America?

We doubt if American steel, shapes or plates, will ever reach as low a figure as that prevailing before the outbreak of war in Europe. The reason for this is two fold, first the labor cost and second the increased cost of obtaining iron ores. The time will soon be here when iron ore in America can no longer be scraped off the surface, as it were, and deep mining, the condition that makes British steel cost as much to produce as American steel, will be the order of the day.

Financially, the American steel shipyards, following the slackening of the present great demand for tonnage, should be in a better condition to face competition from abroad than ever in their history and mechanically they will certainly represent the finest equipped set of shipyards in the world, but, unfortunately, present conditions militate strongly against the practice of shipyard economies.

The American yard has learned the secret of putting out a ship in record time. This carries with it certain items of saving that cannot be ignored and this may be found to mean more in the way of lessening a ship's cost than most people look for. It should materially decrease the overhead chargeable to each ship and it is to the overhead cost that we must hopefully look as one of the greatest opportunities for saving.

One thing is certain, our Government must get behind our shipbuilder and our shipowner, and help them in every reasonable way, for this is the one real safeguard against the shipbuilding industry and the newly awakened shipowner sentiment in this country from losing their grip as they did once before in this nation through Governmental neglect and indifference.

A Valuable Foreign Trade Discussion

One of the most interesting and instructive group of talks ever delivered in San Francisco was furnished in the program of the monthly dinner meeting of the Commonwealth Club of San Francisco held on August 15. The general subject of the evening was San Francisco's foreign trade opportunity and the program consisted of a main address by Mr. John H. Rosseter and a number of short talks by a group of men who were well qualified to handle the subject from its many different angles.

In all the addresses given during the evening there was a noticeable absence of spread-eagleism, each speaker seeking to give merely a quiet, clear analysis of facts and state the opportunity and needs of the situation as they appealed to him. In opening the addresses, Mr. Rossiter, who is the moving spirit in W. R. Grace and Company at San Francisco and who has played a large part in the revival of the trans-Pacific services of the Pacific Mail, spoke out of the fulness of a knowledge following a protracted trip through the Orient coupled with the experience of many years spent in the shipping business and an ardent desire to see the American flag occupy a fitting place in the commerce of the Pacific. Mr. Rosseter complimented the Japanese nation highly on their success on the ocean—a success made possible through the enterprise of her business men and the helpful co-operation of her government. In part he spoke as follows:

"Is it not sad to think of our own United States as the only government not maintaining or encouraging—not to say discouraging—steamer communication with its insular possessions? I refrain from contrasting our attitude with the firmly established policy of other nations, notably Great Britain, France, Holland, Italy and Japan.

"Revenues of sea-borne commerce as a national resource have never been understood or appreciated by our government. Let us hope the experience of the past few years will not be lost.

"Our shipping needs are the foremost question of the hour.

"It is for us to win anew the leading place in the ocean race of nations.

"At the moment, a wonderful opportunity awaits our enterprise. That which might have taken a generation to accomplish is now within our grasp. The war has worked a great change in the trade routes, especially to the Indies.

"At the outbreak of hostilities the German lines immediately disappeared, and with the appearance of the submarine in the Mediterranean British, French and Japanese lines were compelled to abandon the Suez Canal route.

"The longer route via Cape of Good Hope and the great destruction of ships wrought by submarines has resulted in a severe congestion and very high freight rates.

"The change of greatest interest to us is the dislodgment of the artificial channel of trade built up by our European competitors via Suez.

"Do you realize that the United States consumes more than 60 per cent of the products of the tropics, which means largely the products of the East Indies, and that prior to 1916 we were receiving these articles via London, Rotterdam and Hamburg? Certainly not the line of least resistance nor in any sense a natural channel.

"Take, for instance, the rubber industry. In this the United States leads so far that we have practically no serious competitor. Rubber manufacturers located in Ohio alone import upward of 100.000 tons of rubber.

"To obtain their supplies formerly they had to go to the markets of London and Rotterdam. There rubber from the Straits Settlements was shipped via Suez. After paying London dock charges and commissions and freight to New York, there was still to pay rail freight to Akron.

"This commerce is now moving via Pacific Coast ports and rail direct to the manufacturer.

"It was the same way with spices. The merchant at San Francisco obtained his supplies largely from Europe via New York and our big interior markets obtained all supplies by that roundabout and costly route.

"The distance from Singapore via Suez and London to New York is 12,448 miles as against Singapore to San Francisco of 7571 miles.

"What we need most is steamer communication and development of the Philippines. The government should encourage this commerce. It can do so.

"There is a very general and erroneous impression that direct commerce with the Orient can be moved to the best advantage via Panama to Atlantic ports. I have always resisted that theory, but it might not be amiss to again say that the steaming distance from Manila on the shortest route to Panama would be only 119 miles less than the route via San Francisco, and that the distance from Manila to Panama via Honolulu is only fourteen miles shorter than via San Francisco."

Mr. George Bronson Rae, who has just left Shanghai, spoke ably on the lack of any real United States Government policy in the Orient. He sketched briefly the history of several large railroad contracts entered into by American capital and maintained that American enterprise in China would never get anywhere unless our Government asserted itself to properly safeguard American capital that was honestly and legitimately seeking an outlet in the Orient.

Mr. Charlton B. Perkins, who has lived for fifteen years in China, stated the foreign trade opportunity statistically by pointing out the following facts: If the United States had developed its trade with China to the same extent as with Japan, our annual sales to the Flowery Kingdom would be increased from $26,844,000 in 1913 to $72,457,920 in 1917. If our trade with British India had been similarly developed our exports to that country would now be $372,170,500 instead of $15,763,456, at which figure they stood in 1913. If, however, we had developed our trade with both India and China to the same extent as we have developed itwith the Philippines our exports to these two countries would now exceed $2,000,000,000 yearly.

Here indeed is a shining reward for whatever we may do to foster the foreign trade of our country and this is an opportunity not only for San Franciscco, Portland and Seattle, but also for the entire Pacific Coast region, interior as well as sea coast for our western sea ports would become the assembly and delivery centers for the entire western half of the United States.

This opportunity has been before us for years and will be before us for all time in the future, but the present favorable moment for grasping this opportunity, the chance to build up a great shipping, exporting and importing community along the Pacific Coast and of making Manila stand in the same relation to American shipping as Hongkong does to the British and Kobe does to the Japanese shipping, will in all probability never present itself to us again. If we are to reach out our hand and take the great prize which the gods of chance have placed before us it must be done now, and we cannot take and hold this prize unless American sentiment shall permanently accept the ocean as the most potent factor in our future destiny and aspirations.

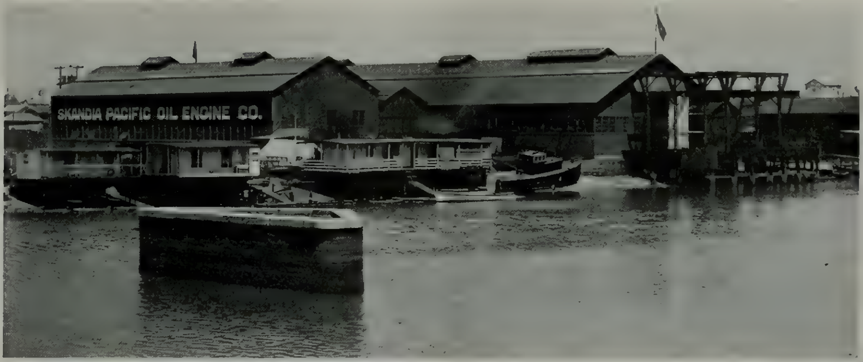
UNIVERSITY NAVIGATION CLASSES

With the demand for trained officers already beyond the supply, and with the shipping bill tending to increase that demand, the Government is finding it necessary to establish schools throughout the country for the training of navigators. The University of California has been doing its part toward turning out these men in the past, but is now to undertake such instruction on a larger scale, under the direction of Dean A. O. Leuschner, head of the department of astronomy and director of the Students' Observatory. Classes in navigation and nautical astronomy are to be opened in the Ferry Building, September 5th, to prepare men for the Government examinations for mate's and master's licenses in the merchant marine.

Daytime students may complete the work in three months; classes given in the Lick Building and on the University campus; or in the night course by six months' work of three evenings a week. The classes are to be limited, and will demand of the student an elementary knowledge of arithmetic.

A number of the men who completed their work in the University of California Summer Session are now operating boats as junior officers for some of the local companies.

Further information may be secured at the San Francisco office of the University Extension Division, Room 309, 62 Post St., or at the Berkeley office, 301 California Hall.



The waterfront at the Skandia Pacific Oil Engine Company's plant, showing extension of overhead crane tracks for unloading and loading supplies and installing machinery in vessels.

A Distinctive Engine Building Plant

AMONG the many engine building plants now located on the Pacific Coast there are several that are worthy of special study on account of the high character of shop equipment that has been been provided and of these one of the most interesting is the plant of the Skandia Pacific Oil Engine Company at Oakland, California.

At the time the Skandia Pacific Oil Engine Company was formed to undertake the construction of Skandia engines on the Pacific Coast, the management looked carefully into the possibility of obtaining a plant already in operation and at the same time susceptible of enlargement and improvement. The works of the Gorham Gas Engine Company at Oakland were finally secured and the work of changing, enlarging and improving the shops of this well known gas engine concern was undertaken immediately.

The Gorham works at the time of their absorption by the Skandia-Pacific were well equipped with a good line of machine tools and, as this company had been keenly interested in the heat treatment of metals, there was also a complete installation of heat treating furnaces.

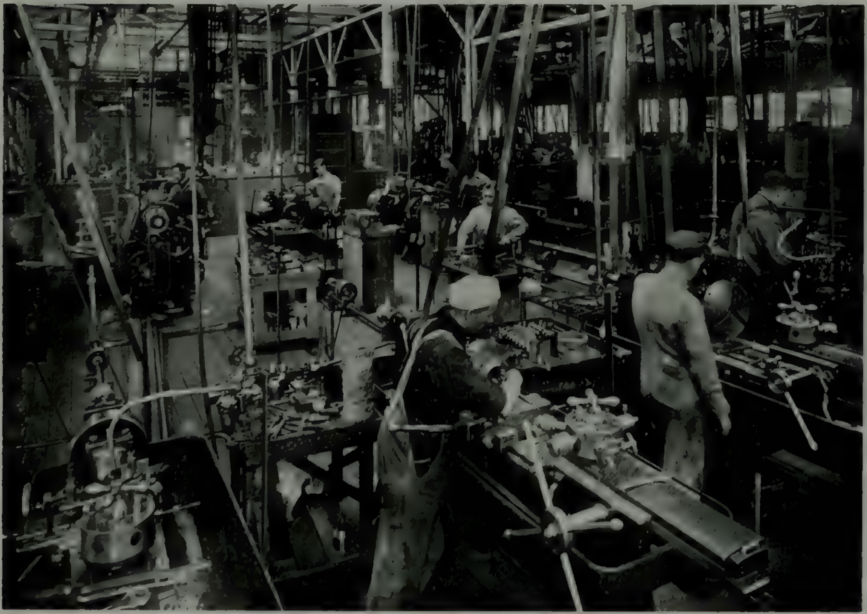
The Gorham plant was housed in two buildings and the new owners promptly added to their available space under cover by roofing over the gap between the two original shops and then extending the main building out to their water front.

The original main building is now utilized for heavy tools and the erection of finished engines. The extension that was built on to the main building houses one of the best equipped test stands on the Pacific Coast. The stand is large enough to accommodate six 240 horse power Skandia engines at the same time. The test floor is a concrete slab furnished with all the necessary anchor bars for bolting down engines quickly and efficiently. In the main shop some very large new tools are now being installed including 42, 48 and 60 inch lathes with 30 foot beds. The case hardening department, store room for finished parts, drawing office and general shop office are also located in the main building. The extensions of the main building carry the structure from the water front of the property through to the inner line along the Southern Pacific Railroad Company's tracks. The tracks for the traveling electric cranes covering the main bay of this shop have been extended out over the concern's spur tracks and also the length of the wharf on the estuary so that material coming in or being shipped by water, railroad shipments, engines being erected or placed on the test stands and the heavy tools in the main machine shop are all served by the two 10-ton electric traveling cranes which have been installed. Numerous jib cranes are provided for handling the work in and about individual tools. While it will be noted from the picture of the main bay of the large tool shop that the belt drive is used, the large new tools will be individually motor driven.

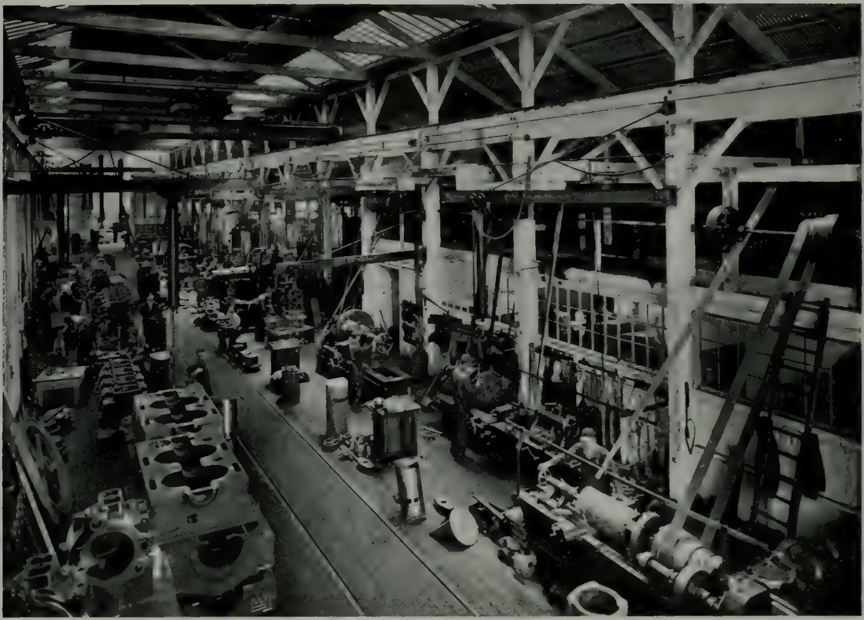
The second of the buildings in the original Gorham plant has been divided into a pattern shop and a machine shop for small work. This machine shop section is served by a 5-ton overhead traveling crane and numerous jib cranes. The pattern shop, picture of which is shown, has been fitted up with the latest wood working tools all driven by independent motors and here all Skandia patterns are made in duplicate.

In building over the space between the two original shops, the Skandia Pacific Oil Engine Company has secured an excellent all-around shop arrangement. One end of this structure, located directly between the pattern shop and the case hardening and heat treating department, has been utilized for a brass foundry, all the brass castings

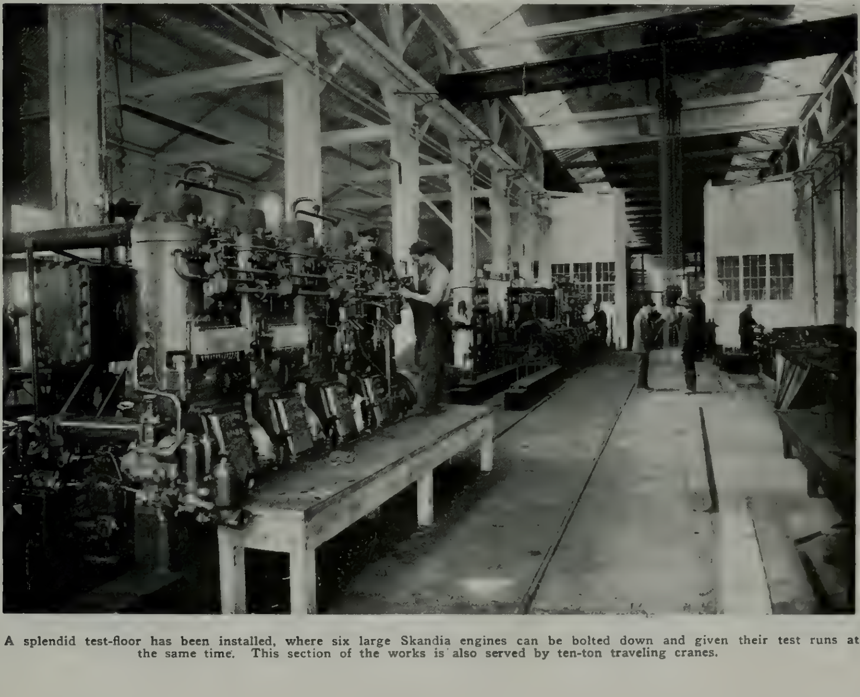
The pattern-shop at the Skandia Pacific Oil Engine Company's plant. Modern motor-driven woodworking tools have been installed here, and in this light, airy shop all Skandia patterns are turned out in duplicate.



A feature of the shop where Skandia engines are made, and where Werkspoor Diesels are to be built, is the splendid installation of automatic and semi-automatic tools. These are all housed together and the department has direct connection with the tool-room.



The main bay of the machine-shop, showing tool-room to the right, jib cranes for handling work around the individual tools, and one of the ten-ton traveling cranes, two of which serve this section of the shop.



A splendid test-floor has been installed, where six large Skandia engines can be bolted down and given their test runs at the same time. This section of the works is also served by ten-ton traveling cranes.

used being made right on the premises. The opposite end of this structure has been fitted up with a battery of screw machines a splendid collection of semi-automatic tools having been secured for this department with men trained in the use of these now almost indispensable tools. Located between the brass foundry and the space for these semi-automatic machines is the tool room, situated in the heart of the plant. The tool room thus faces every department of the plant and this highly important adjunct of the modern shop is reached direct from any section of the works.

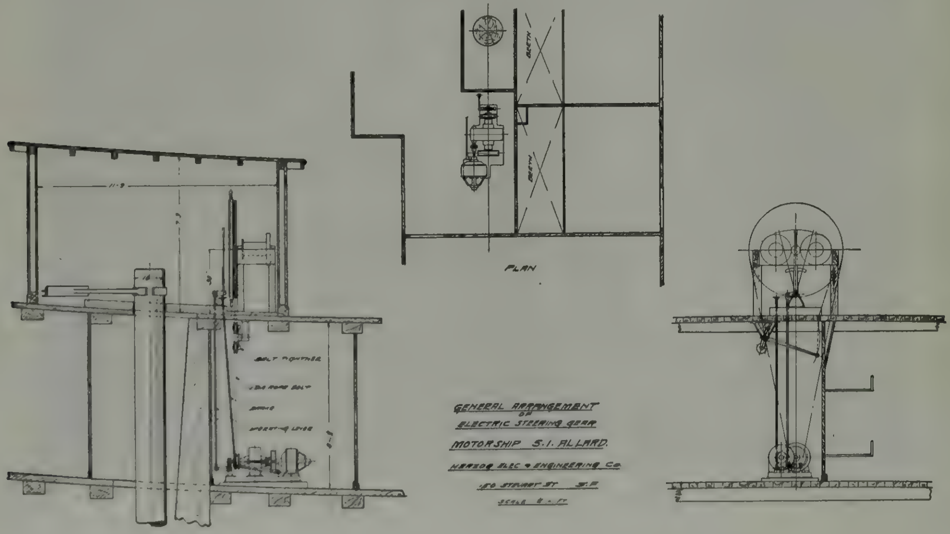
Provision has now been made for a further large extension of the shop facilities by extending the machine shop section occupied by the smaller tools and the building housing the semi-automatics and tool room.

The Skandia-Pacific Oil Engine Company recently secured the building rights on the Pacific Coast for the Werkspoor Diesel engine. This will eventually mean still greater extensions to this splendidly equipped plant. The building of Werkspoor engines on the Pacific Coast is bound to give a great impetus to the use of internal combustion engines for large vessels since the Werkspoor has attained splendid success on large ocean going craft and has been placed in the hands of a concern that has spared no expense in fitting itself to turn out the very highest class of marine engine work.

Interesting Steering Developments

No innovation in the deck machinery of ships has caused more favorable comment than the simple and efficient electrical steering gear devised by the Herzog Electric and Engineering Company, of San Francisco, in conjunction with Mr. H. W. Hewitt, Chief Engineer of the Charles R. McCormick fleet. Following the installation of this machine on the "S. I. Allard" of the Charles R. McCormick fleet, there has been a steady demand for these steering systems as they fill a long felt want especially in those vessels which are just large enough to make the handling of the wheel by hand extremely trying when the ship is negotiating narrow crooked channels or a fast rudder is required in crossing bars.

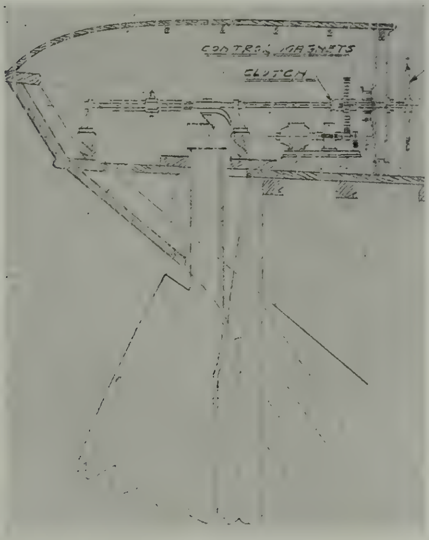
The great attractions about the Herzog gear, sketch plans of which are shown herewith, is its extreme simplicity and fool-proofness and the very small amount of power it absorbs. Current from the ordinary electric lighting sets in use on the auxiliary schooners operating on the Pacific is found to be more than sufficient to meet all the needs of the motor operating the gear. The wheelsman simply moves a vertical lever to port or starboard and the gear is engaged and turns the wheel as required, stopping the moment the lever is moved back to the neutral position. In this way the rudder can be thrown from hard over to hard over in twenty seconds and the man or men at the wheel are relieved of the arduous pulling and hauling when the vessel is operating in a choppy sea or making a difficult channel or bar. The power absorbed varies of course with the speed of the ship and the condition of the sea, but on the "Allard," a 2,999,999 feet lumber capacity motorship, the maximum power absorbed



at any time was less than two horse power while in still water this was negligible.

We also show a sketch illustrating another Herzog device for the remote control of the steering engine. In this simple device two wires running to the bridge take the places of the pipes in the usual telemotor control.

The Herzog electric steering gear is proving extremely popular with the crews of the vessels on which it is installed as it removes all the arduous labor from the man at the wheel and at the same time enables him to hold a course more accurately.



SHIPBUILDING

As an example of the way shipbuilding has affected some of the cities in the South, the case of Mobile, Alabama, furnishes a good example. Here will be found the Alabama Dry Dock and Shipbuilding Company building and repairing several vessels; Harrison Brothers building schooners; the Henderson Shipbuilding Company building submarine chasers and schooners; the Murnan Shipbuilding Corporation constructing four cargo vessels; the Kelly-Atkinson Company of Chicago has secured a site and has begun the construction of a plant for the building of eighteen composite vessels for the United States Shipping Board; the Scott Shipbuilding Company are building wooden vessels and the Tennessee Coal, Iron and Railroad Company, a subsidiary of the United States Steel Corporation, has bought several thousand acres of land adjacent to Mobile including sevarel miles of river frontage and it is expected that not only ships but also a steel plant will be built on this property.

The latest British Columbia concern to enter the shipbuilding field is the Vancouver Shipyards and Engine Works, Ltd., with a capital of $750,000. Mr. S. Mathewson is the Vancouver representative of the new concern.

The Coos Bay Shipbuilding Company of Marshfield, Oregon, has just about completed its yard installation and is now laying keels for its first four contracts.

Supple & Ballin have been forced to extend their yard property in Portland. A strip of property 200 feet wide adjoining their plant has been leased and the additional space will be utilized mainly for material storage.

The Hollywood Shipbuilding Company has been incorporated at Oakland, California, by David Hollywood and others. It is understood that the new concern holds contracts for six steel freighters for the Shipping Board.

The steamer "Navajo" built by the Craig Shipbuilding Company at Long Beach to the order of Swayne & Hoyt was burned recently according to an announcement of the Navy Department. The "Navajo" was built in 1911 and was 242 feet long, 42 feet beam and 28 feet 3 inches moulded depth. The "Navajo" was of the usual Pacific coasting type.

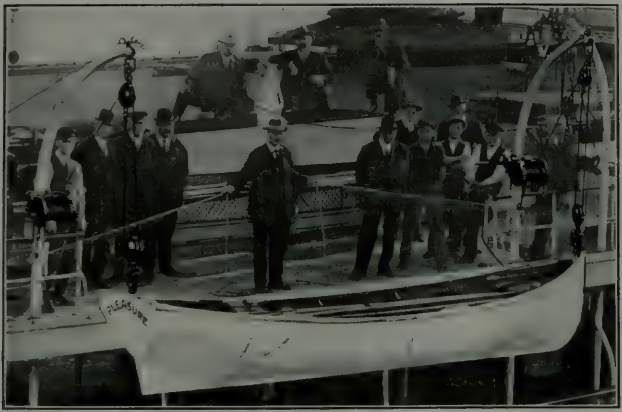
The British Government has completed an arrangement whereby the vessels of the Nippon Yusen Kaisha fleet will make calls at Liverpool. Heretofore the European lines of the big Japanese steamship company have only made calls to British East Coast points.

According to advices received by Mr. John P. Dowling, San Francisco representative, the four large steamers of the Blue Funnel line, the "Antilochus," "Protesilaus," "Ixion" and "Talthybius," which were commandeered by the British Government, are to be released and will return to this coast in time to resume their regular sailings about the first of the year.

Mr. Drew Chidester, president and general manager of the newly formed Trans-Oceanic Company, has secured the new Japanese steamer "Yubari Maru" and will dispatch her from San Francisco for Yokohama and Kobe during the latter part of September. The new concern has opened offices in the Clunie building.

The big schooner, "Levi W. Ostrander," 260 feet over all by 44 feet moulded beam by 20 feet moulded depth, was successfully launched from the Tacoma plant of the Seaborn Shipbuilding Company on July 31.

A One Man Handling Gear



One man lowering lifeboat from deck. He can control the windlass from the lifeboat just as easily. See below.

In these days of submarine piracy, apparatus designed to facilitate rapid departure from a sinking ship is of double importance. Boat releasing and handling gears are of course very numerous as perhaps no other article of ship equipment has appealed more to the inventor. However, the accepted methods of boat handling are comparatively few and have won their place on shipboard through merit. Among these accepted systems one of the most interesting is the combination of J-H Lifeboat Windlasses and Rapid Releasing Hooks.

One man lowering himself to the watch; he perfectly controls the speed with the J-H Windlass controller lines.

In the J-H windlass the frame and crank handles are of cast steel; all working parts of machined tool steel or bronze. The mechanism is compact, simple and strong, and of great power capacity. A sheet steel cover is provided to protect all working parts from the action of water, snow or ice. The power is transmitted from the shaft to the cable drum by a pinion and gear, and the cable runs directly from the drum to the block attached to the davit. These windlasses are also made with a divided cable drum and bolted to the deck, the single-drum windlass being bolted to any style of davit or to the deck as desired—the divided drum providing for the handling of both ends of a lifeboat from one windlass. One end of a controller line is made fast to the frame of the windlass and this line is given a double turn around the drum of the crank-shaft, so that a slight tension on this line causes it to act as an effective brake on the shaft. Repeated tests have shown that a tension of less than ten pounds on the controller line would balance and hold in suspension a weight of 2100 pounds on the boat falls. Of course, any desired tension may be secured by increasing the number of turns of the controller line around the crank-shaft drum. From this brief description it will readily be seen that the movement of the boat falls can be checked, speeded up or stopped entirely at the will of the man holding the controller line, and as this same man, with a slight pull on a lever releases both ends of the boat simultaneously, the J-H system has every claim to be considered strictly a "one-man proposition."

The frame of the J-H Rapid Releasing Hook and the releasing lever are made of steel or bronze as required. The rivets and pins are of bronze or hardened steel and are run through bronze bushings. The tumbler and pin to which it is attached are of hardened steel. When the hook is closed (see solid line position on the accompanying diagram) the tumbler engages the upper crossarm of the frame in such a manner as to securely lock the hook in its closed position. It is impossible for these interlocking parts to become disengaged until the re-

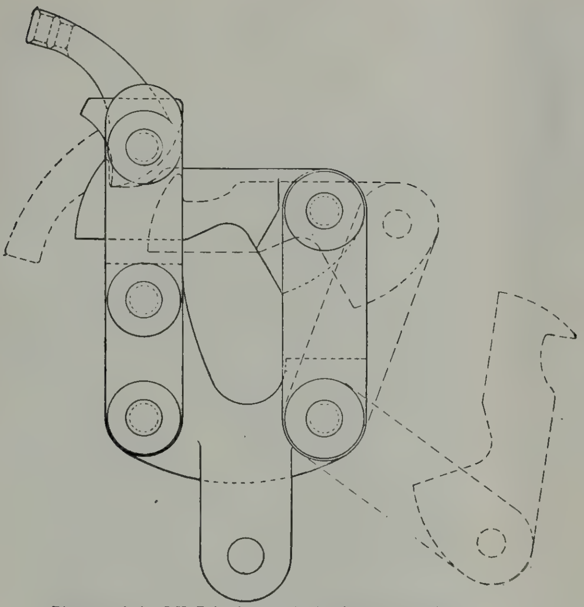


Diagram of the J-H Releasing Hook showing the locked, closed and open positions.

leasing lever (which operates the pin and tumbler) is lowered from the upright position to the dotted position indicated on the diagram. The instant and simultaneous release of these hooks at both ends of the lifeboat is accomplished by means of a simple and positive releasing mechanism from which a cable runs to the lever of each hook. It would be a practical impossibility, without dismantling the releasing mechanism, to release one end of the boat prematurely.

This simple and efficient system of lowering and releasing life boats is being handled in the United States and Canada by the Eckliff Circulator Company of 58 Shelby street, Detroit, Michigan.

GAS PRODUCER TEST

In a recent test on a small Boston tug, the "R. G. Purdy," some excellent results were obtained from a gas producer made and installed by the Nelson Blower and Furnace Company of Boston and known as the Galusha gas producer. The boat traveled 25 miles at a speed of 8½ miles an hour on a fuel consumption of 280 pounds of anthracite coal. The size of the boat and the horse power attained were not mentioned in the report, but the Nelson people claim that 100 horse power per hour can be obtained on a consumption of 100 pounds of pea coal. The fuel cost for the "Purdy's" 25 mile trip was $1.12.

Western engineers will be interested to learn that the Nelson Blower and Furnace Company is carrying on an extensive test with Pacific Coast coal, using a tar extractor in conjunction with the producer, as Western coals have a very large tar content. A plant of this character has been in operation for some time, but Mr. Galusha, chief engineer of the Nelson firm, has insisted that the machine be given six months' or a year's tryout before any attempt is made to introduce it commercially.

A NEW SHIPPING FIRM

The firm of F. F. Connor & Son entered the local field on August 1st as general shipping and forwarding agents and marine insurance brokers, with offices at 16 California Street. The firm will also act as general agents for the Anglo-Oriental Shipping Company, a large concern with offices in New York, Chicago, St. Louis, and New Orleans. The junior member of the firm, Mr. L. Connor, was formerly for five years in charge of the export and transfer departments of McNab & Smith, while F. F. Connor has been acting as traffic manager of the Java-Pacific Line. Prior to his connection with the Oriental line, Mr. Connor was traffic manager for the old Pacific Mail.

The Anglo-Oriental Shipping Company, which will be represented on the Pacific Coast by the Connors, is headed by Mr. V. M. Smith, who is well known on the Pacific Coast, having been connected with the Western Meat Company and the Robert Dollar Company. Mr. Smith is also a past president of the Transportation Club of San Francisco. One of the principal activities of F. F. Connor & Son will be local bookings for trans-Atlantic tonnage, and the standing of the members of the firm in the community and their long experience in the shipping business indicate a prosperous career for the new concern.

LAUNCHING AT OAKLAND

On August 25, the Moore & Scott Iron Works launched the big freighter "War Bay," one of a number of vessels building at the big Oakland plant for the Cunard Steamship Company. These vessels are among those commandeered by the Government, and they will be finished to the order of the Emergency Fleet Corporation. Several British representatives of the original owners of these boats recently arrived in San Francisco to oversee construction work on them, and they will now have to return home for other duties.

LAUNCHING OF THE "FRED W. WELLER"

On August 8th, another huge steamship gracefully glided into the water at the Union Iron Works, Potrero, and this time it was the largest commercial steamer built by any commercial shipyard on the Pacific Coast. Its owner is the Standard Oil Company of New Jersey, named after one of the directors, "Fred W. Weller," and christened by Mrs. William S. Rheem, wife of the president of the Standard Oil Company (California), at the invitation of Mr. Fred Weller. The sponsor thoroughly smashed the bottle of California champagne, proclaiming at the same time, "I christen thee Fred W. Weller," and the 5250 tons of metal calmly glided into the water without mishap. The owners and builders jointly presented Mrs. Rheem with a diamond necklace, and President J. A. McGregor, of the Union Iron Works, in a gracefully worded speech made the presentation.

Launchings have become very usual on the Pacific Coast in the past two years, but the "Fred W. Weller" is worthy of special comment as showing the great advancement in tank steamship construction on the Pacific Coast. The first tank steamship built on the Pacific Coast, and again by the Union Iron Works, was the steamer "George Loomis," built in 1896, with a cargo capacity of 6500 forty-two gallon barrels, exclusive of bunkers, and considered a large tanker at that time. The latest production, the "Fred W. Weller," has a cargo capacity of 112,000 forty-two gallon barrels, exclusive of bunkers. Please note the great advancement in twenty years, a "Fred W. Weller" being considered impossible in 1896.

The dimensions of this huge tanker are 520 feet over all, 500 feet between perpendiculars, 68 feet beam, and 38 feet deep from top of shelter deck. The vessel has twin screws, driven by twin triple expansion engines, and the three Scotch boilers, fitted with Howden's forced draft, are arranged to burn either oil or coal. The bunker oil capacity is 6000 forty-two gallon barrels, so when fully loaded the "Fred W. Weller" will have on board a total of 118,000 forty-two gallon barrels, and adding to this the fresh water, provisions and supplies, a deadweight of approximately 15,000 tons is the result.

The first half of November, 1917, should see this great addition to our American Merchant Marine in service.

One of the past month's launchings at the San Francisco plant of the Union Iron Works Company.

MR. C. H. PEARSON

Mr. Pearson is a young man, still in his thirties, and was the first representative in the Pacific Coast territory to specialize on overhead equipment. With his headquarters in San Francisco, Mr. Pearson makes his home at the Olympic Club, of which he is an ardent member. Although born and raised in the metropolis of the world, New York, and subsequently traveling extensively through Europe and the Orient, Mr. Pearson points to the Pacific Slope as the one bright field to stake his all and that is what he is going to do after an experience of nearly seven years.

Mr. C. H. Pearson.

Mr. Pearson is a strong advocate of missionary work and spends most of his time in this capacity. When not busy promoting the sale of Yale triplex blocks, electric hoists, and traveling cranes, with the user, he is improving his time with the many enthusiastic Yale dealers on the Coast.

CURTIS STEAM TURBINE FOR FANS, BLOWERS AND PUMPS

The General Electric Company, of Schenectady, N. Y., has developed a Curtis steam turbine in a wide variety of capacities to drive fans, blowers and pumps for boiler feeding and circulating systems. It is called the Type L and is of the impulse type. The number of stages and rows of buckets vary with the capacity. The principles used and mechanical practice evident in the construction are the result of the vast experience of the manufacturers in producing turbines for practically every class of service.

A split wheel casing is used to permit ready inspection of the buckets, which are of bronze, securely dovetailed into the rim of the wheel. The exhaust steam is free from oil and is well suited for heating feed water.

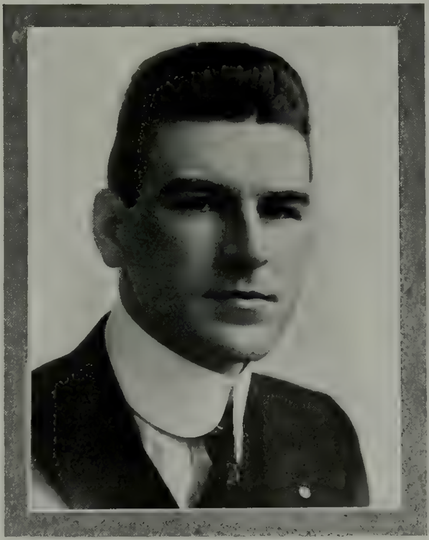
Speed regulation is close and reliable, and the speed may be changed by hand-wheel adjustment while the turbine is in operation. A constant running speed is maintained by a simple and powerful speed governor mounted directly on the shaft and controlling a double balanced piston-valve type throttle.

The main shaft carrying the turbine and governor runs on babbitted bearings with renewable linings, and is fitted with readily accessible packing glands.

Three feet support the rigid frame of the turbine to insure the bearings always being in line. The wheel casing is neatly lagged with planished iron.

IN THE WIRELESS WORLD

No wireless telegraphy official is more widely known up and down the Pacific Coast than Mr. E. W. Horsman. Shortly after joining the force of the United Wireless Telegraph Company in 1911, Mr. Horsman recognized the need and opportunity of a news service on shipboard, and was instrumental in bringing the "Ocean Wireless News" into existence. While district superintendent for the Marconi Wireless Company of America, Mr. Horsman will still retain the direction of the "Ocean Wireless News," although, naturally, the details of this much appreciated service will be handled by others.


Mr. E. W. Horsman.

Shipping Among the Allies

London, August 1, 1917.

Extension of British Shipyards

While there is every promise of extensive shipbuilding developments in the overseas Dominions, it is gratifying to learn that that industry in the United Kingdom has lately undergone considerable expansion. During the past three years every yard of any importance has been extended, with the result that if, after the war, British shipowners do not speedily succeed in making good their tonnage losses it will not be for lack of construction facilities. Most of the improvements, as would be obvious, have been necessitated by naval requirements, but they will be of very great advantage when conditions are again favorable for mercantile work. In this connection it may be mentioned that while the first standard vessel planned by the Shipping Controller will be ready for service by the end of July, excellent progress is being made with the others on order, and very shortly the rate of output will be much accelerated. In addition to the expansion of old establishments several new concerns have begun operations, or are preparing to do so, in the whole of the United Kingdom.

Standard Ship Plans

Although, as mentioned above, the first standard vessel is now almost ready for service, and it is likely that the subsequent rate of completion will be considerably accelerated, the output of tonnage of the type would have been greater, I hear, if it had not been for structural changes decided on since the contracts were placed. In several important respects the plans of the Shipping Controller have undergone substantial alteration within the past few months. In accordance with Admiralty requirements, for example, the speed is to be diversified, so as to prevent a too easy adjustment of submarine markmanship, while, in consequence of Sir Joseph Maclay's (the Shipping Controller) desire to improve the crews' quarters, a change which may be regarded as a recognition of the splendid work merchant seamen have done during the war, the berthing accommodation is to be aft, instead of forward. This, among other things, will, it is believed, lessen the danger of attacks by submarine or accidents from mines. There will also be a separate room for meals, and two-bunked cabins in which to sleep, as compared with the open forecastles now generally in use. The new arrangements represent a marked advance on anything of the kind hitherto conceded, and I learn that the Board of Trade intends to amend the Merchant Shipping Act so as to make provision for the alterations as regards new construction.

Port of London Enterprise

In consequence of extensive improvements by the Port of London Authority, and of developments arising out of the war, several shipping companies, I hear, contemplate the transfer of their headquarters to London. Action in the matter is about to be taken by the Clan line, which is interested in the African and Eastern trades, and has acquired the premises necessary for housing its increased staff. There seems reason to believe that the Thames will soon become the principal center in the United Kingdom for traffic from the Dominions, especially as the Port of London (Various Powers) Bill, now before a Select Committee of the House of Lords, provides for the more economical transportation of overseas goods. Recently the extension of the main dock at Tilbury for the accommodation of large ocean-going steamers was brought into full use, the water area added by the enlargement being about twenty acres. Vessels up to 25,000 tons can now be dealt with there conveniently, as compared with ships of about half that size before the improvement was effected, while further up the river good progress is being made with the Port Authority's program, which, however, cannot be completed for several years.

Buying Ships' Stores Abroad

It is officially announced that a number of shipowners have already arranged to purchase ships' stores and provisions at ports abroad, so as to avoid drawing on stocks at home, and the three departments concerned—the Ministry of Food, Ministry of Shipping, and Board of Trade—request that all shipowners will follow this example, and forthwith give instructions that stores and provisions are always to be purchased at ports abroad when this is at all practicable.

Just a year ago the Board of Trade expressed the opinion that "with the object of conserving the existing supplies in the United Kingdom and of avoiding waste of tonnage space" efforts should be made to purchase ships' supplies abroad. In January of this year the Shipping Control Committee urged the same point, and later Lord Devonport, as the then Food Controller, warmly approved such a course.

The matter was again brought to the front in April by F. H. Houlder, who in a letter to the London "Times" explained the circumstances under which the master of one of the Houlder steamers had bought four months' supplies of flour and sugar in North America, of which, as the next voyage of the vessel was a short one, the owners desired to land a proportion at Newport for reissue to other of their steamers. The Customs authorities maintained, however, that this action must be held to be the discharge of cargo, involving the ship in the payment of light dues. It was pointed out that this action threatened to frusrate the success of the scheme, and as the result of the publicity given to the matter the firm of Houlder were afterwards informed by Trinity House (the authority dealing with collection of dues, etc.), that the dues would be remitted.

British Shipping and the German Bill

The publication of the features of the bill for the Restoration of the German Mercantile Marine seems to have distinctly increased the restiveness of the managers of the British liner companies. It has furthered the movement, which was already quite considerable, in favor of pressing the Government to announce its future shipping policy. A real danger exists that the discussion respecting the earning of large profits may obscure the extreme importance of providing for new construction. It is known, of course, that a very large number of standard cargo steamers are now being built by the Government, and several excellent reasons could be adduced in support of this policy. These ships will be suitable for loading grain and cargoes of raw material which are needed in this country, and they will help the nation to win the war. But a fleet of purely cargo steamers does not constitute a mercantile marine worth the name. Immensely important as the work of the cargo steamer is, it is not she who provides communication between all parts of the British Empire. That is the duty of the liner. Naturally the weekly figures of losses issued by the Admiralty do not discriminate between liners and cargo steamers. But it is sufficiently obvious that out of the large number of vessels sunk many must have belonged to the liner class. It is known, however, that practically nothing is now being done to replace these vessels. The managers of mail and passenger vessels admit that they cannot do much in the direction of rebuilding this type of ship during the war, but they want to be in a position to lay their plans now for building at the earliest possible moment. These ships were very costly to build even before the war, and no one cares to predict when, if ever, costs will fall even to that level. In any case, it seems to be quite clear that many plans for building which were in preparation are now entirely suspended, pending an indication of Government policy.

Easier War-Risk Rates

Although the premiums quoted at Lloyd's to cover war risks are still high, the market is, I hear, very much easier now than it was a few weeks ago. Charges for the North Atlantic routes, which at one time were becoming almost prohibitive, are now lower than the North Sea rates. Since the entry of the United States into the war, marine insurance operations generally have not been quite so restricted, mainly in consequence of increased business opportunities. While the question as to the utilization of the money the British shipowners receive on account of insurance for vessels lost through war perils is still receiving consideration here, I learn that a new law on the subject has come into force in Denmark. Under it the insurance must be devoted to providing vessels in place of those lost, and if a replacement ship cannot be obtained at once the money must be set aside for the purpose.

Japanese Steamers for Liverpool

In order to relieve the congestion of shipments on the West Coast the Government have come to an arrangement with Japan by which the European liners of the Nippon Yusen Kaisha will extend their service to Liverpool. Though the European service of the Nippon Yusen Kaisha is of over twenty years' standing, the calls in this country have been confined to London, Middlesbrough, and other ports on the East Coast, and yet Japan's trade with the Western ports has been very considerable. One result of the new arrangement will be a decrease in the tonnage for London, but I am told that it is intended to try to make good the deficiency by dispatching additional steamers.

"The British Shipping Industry"

At a time like this suggestions and details of the British shipping industry are clearly in order. A very interesting little booklet has been published by Constable and Company, of London, at the price of 25 cents and written by Edgar Crammond. It deals in three chapters with British shipping before the war, during the war and in the future. The booklet is crowded with suggestions and information to shippers, ship brokers and shipowners, and the author expresses the view that a strong, prosperous shipping industry working in the closest agreement with the State is one of the greatest national assets which we can possess; and this is the objective for which we all should aim.

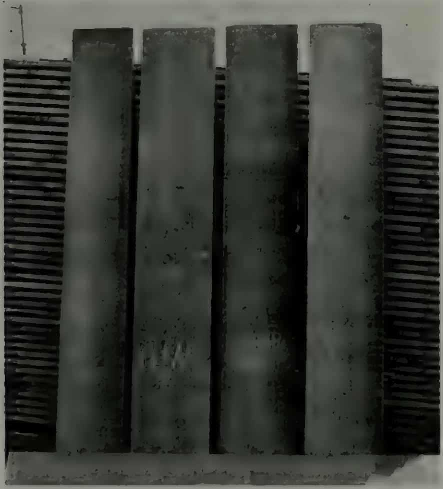
The Skinner & Eddy Corporation launched the 8800-ton deadweight freighter "Verdun" on August 16. The "Verdun" is building to the order of the Messageries Maritimes of Marseilles.

CALIFORNIA PINE

White and sugar pine are extensively worked in California and are among the best known products of our western forests. The white pine of the Pacific Coast, while not so soft as that found in the Great Lakes region, excels in color and grain making it a desirable wood for iiside as well as outside finish.

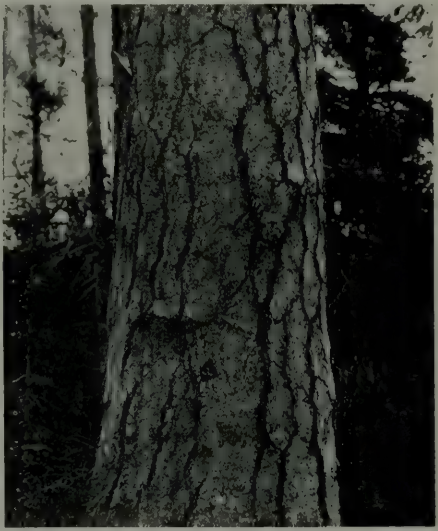
A few cars of big sugar pine logs at the unloading dock of the California Sugar & White Pine Company.

Sugar pine is almost distinctively a California wood or tree, growing in the Sierra Nevada Mountains at an altitude of from 3500 to 6000 feet. The sugar pine attains a size quite often 10 feet in diameter and a height of 250 feet. Owing to its slow and uniform growth and the climatic conditions of its habitat, the tree produces a beautiful, soft, white lumber very free from pitch and shake; in fact it is equal, if not superior, to the so-called cork or pumpkin pine of the Great Lakes region.



Clear sugar pine boards, 26 and 31 inches wide.

To those not acquainted with Sugar pine and California White pine we desire to mention that these woods are now being used more extensively than ever before by shipbuilders in the United States and Canada. Before the United States entered the war and exporting was not prohibited, both white and sugar pine had been used for years in the shipyards on the Clyde, in Belfast and other great centers of that industry, the greatest portion of this exporting business having been handled by the California Sugar and White Pine Company of San Francisco, this concern having been for years the largest wholesaler of these woods in the United States and the first to export these widely known and recognized woods to foreign countries.



The 'lone brother." Trunk of a California white pine tree for length of first log cut, six feet in diameter.

Since the great shipbuilding activity has swept over the United States and Canada, the California Sugar and White Pine Company has interested several of the largest concerns in this industry in these woods and both the sugar and the white pine are giving the fullest satisfaction.

Sugar pine is recognized the world over as the wood de luxe for patterns and is also one of the very best materials for mold loft flooring. California white pine is highly recommended for templates because it does not split in nailing or bending and it is being used for this and other purposes by many shipbuilders throughout the United States and elsewhere.

Both Sugar and California White pine are superior to other soft woods for doors, sash, finish and cabinet work on ships because they are free from pitch or shake and these qualities make them not only easy to work but also very desirable for finished work since they take on and hold paint or enamel finishes in splendid style.

Recent Shipbuilding Events

THE tanker "Fred W. Weller" was launched at the Union Iron Works Company's Potrero plant on August 8. The "Weller" is 520 feet over all, 500 feet between perpendiculars, 68 feet beam, and 38 feet moulded depth. Her cargo oil capacity is 112,000 barrels. The vessel will be driven by twin sets of triple-expansion engines with cylinders 20½, 35 and 60 inches in diameter by 42 inches stroke. Steam will be furnished by three Scotch boilers, working under Howden's forced draft and delivering steam for 3200 indicated horsepower in the engines. Mrs. F. W. Rheem, wife of the President of the Standard Oil Company of California, acted as sponsor for the big tanker.

Mr. W. A. Boole and associates have secured an attractive lease of 3000 feet of waterfrontage and fifty acres of land from the city of Martinez. The frontage possesses exceptional advantages for shipbuilding, and it is expected that the Boole interests which now control the Robertson yard at Benicia will start shipbuilding operations on their leased property immediately. The lease runs for forty years, and according to its terms operations on the land must commence within four months of the beginning of the lease.

The Hanlon Drydock & Shipbuilding Company is repairing the old wooden steamer "Arcata," which was built by the Dickie Brothers in 1876. The "Arcata" will be ready to renew her old-time sea life in about one month.

The gasoline schooner "Martha 11", built at Ditty's ways on Woodley Island, Eureka, to the order of Captain Olson, was launched on August 8.

In connection with the San Francisco Shipbuilding Company, the new concern started for the purpose of definitely deciding the practicability of reinforced concrete as a material for the building of ocean-going ships, the California State Corporation Department has issued the following statement:

"If the experimental work of the San Francisco Shipbuilding Company proves to be the success expected by financiers interested, concrete will be utilized in the building of vessels to be used in carrying the world's commerce in the near future. The company now is engaged in the construction of a concrete vessel.

"This company recently secured a permit from Commissioner of Corporations H. L. Carnahan to sell 3000 shares of its capital stock, par value $100 per share. Out of this total, 2500 shares are to be sold to the following persons and firms: Pacific Freighters Company, Balfour, Guthrie & Co., John H. Hooper, Santa Cruz Portland Co., J. H. Baxter & Co., M. & H. Fleishhacker, Barneson-Hibberd Co., George U. Hind, Pacific Coast Steel Co., Oscar Sutro, Edward L. Eyre & Co., Comyn, Mackall & Co., M. F. Lowenstine, T. E. Pollock, Standard Oil Co., J. C. Zellerbach, Matson Navigation Co., W. H. Talbot, Geo. A. Moore & Co., Charles Sutro and Sidney L. Schwartz.

"With the money obtained from the sale of these shares, the company proposes to build a

The "Navajo," a well known Pacific Coast craft, which was built at the Craig Shipyard, Long Beach, was burned at sea on the Atlantic during the early part of the past month.

concrete vessel, which it will either operate or sell upon its completion.

"The company proposes to lease, from the Redwood City Harbor Company, land situated in San Mateo county near Redwood City, which will be used as a site for the concrete shipbuilding.

"It is estimated that the construction of the vessel will require at least $300,000.

"The officers of the company are: President, W. Leslie Comyn; Vice-President, John Lawson; Secretary, Kenneth MacDonald, Jr.; Treasurer, George U. Hind.

"The executive committee to have the active management of the business is composed of Leslie Comyn and John Lawson."

The Winslow Marine Railway & Shipbuilding Company, Inc., of Winslow, Washington, launched the freight and towing steamer "Anyox," built to the order of the Coastwise Steamship & Barge Company, of Seattle, on August 2. The "Anyox", which was sponsored by Mrs. James Griffiths, wife of the President of the shipbuilding company, is of an unique design which has brought forth much commendation from naval architects, she is 205 feet 6 inches over all, 184 feet 8 inches between perpendiculars, 38 feet 8½ inches moulded beam, 23 feet 4 inches moulded depth, and has a deadweight capacity of 1280 tons. She will be fitted with a triple-expansion engine with cylinders 17, 27 and 44 inches in diameter by 30 inches stroke. Steam will be supplied by two Heine water-tube boilers. A complete description of this interesting craft, together with plans, was published in the May, 1917, issue of the Pacific Marine Review.

The Matsukata shipyard at Kobe, Japan, is understood to have booked an order for twenty 8000-ton deadweight freighters for British interests.

It is reported that the United States Steel Corporation has set aside $6,000,000 for the development of the Federal Shipbuilding Company, one of its new shipbuilding subsidiaries. The plant will probably be laid out with twelve building-ways.

"SHAW" MAKES FAST TIME

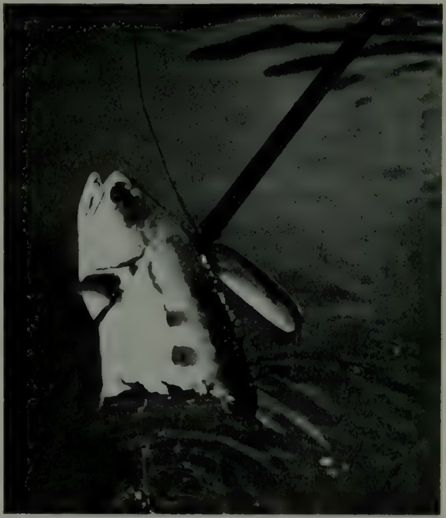
The torpedoboat destroyer "Shaw" recently completed on the Pacific Coast is credited with a splendid run to the Atlantic seaboard. Her time was 14 days, 10 hours and 20 minutes for the 5,858 mile trip. Her cruising speed was about 18 knots and the average for the entire distance including stops was 15.4 knots. Incidentally the Shaw was put through the Panama Canal in record time, 5 hours and 45 minutes, against the previous best time of 6 hours and 20 minutes.

GOOD! ALSO TRUE

We are indebted to Mr. Manuel Eissler, mining engineer of international reputation, for the accompanying illustration. This picture, taken in the Bay of Manila, shows a huge fish immediately after a man-eating shark had completed some very effective work.

The narrative, which is a series of startling incidents, is after this fashion:

Mr. Eissler and his party were engaged in the very fascinating pastime of barricuda fishing off Manila Bay when suddenly the engineer's line cut through the water, spinning his big reel with a great velocity. After some very strenuous efforts to land the fish, it developed that instead of taking the hook, it had merely been snagged.



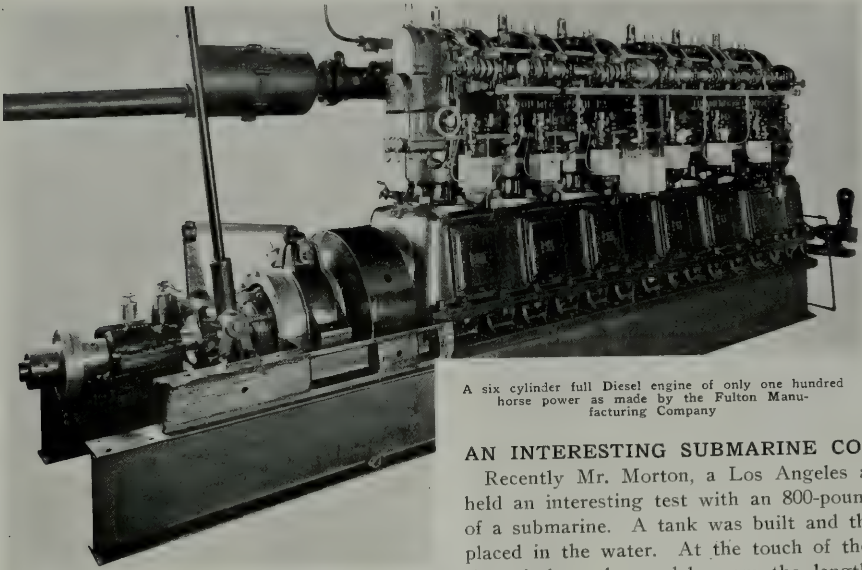
A case where the shark got in ahead of the camera man.

A gaff-hook was brought to the rescue, and after the big fish was hooked, the camera was focused on it as it was being drawn out of the water.

Enter Mr. Shark. The result of his attack is also very obvious. The agitation of the water caused by the shark's sudden departure can be seen.

Mr. Eissler, who is now located in San Francisco, at the Argonauts Club, has spent a good many years in the Philippine Islands. His extensive researches into the mining resources and general history of the Islands have established him as one of the recognized authorities on the subject.

Mr. L. H. Gray of the L. H. Gray Shipping Company has purchased 124 acres of property at Chico, Washington, on which a wooden shipbuilding yard will be established.



A six cylinder full Diesel engine of only one hundred horse power as made by the Fulton Manufacturing Company

A SMALL FULL DIESEL

The Fulton Manufacturing Company of Erie, Pennsylvania, shipped a 100-horsepower full Diesel engine, on July 3rd, to be installed on a boat called the "Manteo," owned by the U. S. War Department, and intended for use in the harbor and river improvement work by the Government engineers with headquarters at Wilmington, N. C.

The "Manteo" is of the usual type of sturdy dredge-tender and her duties will consist in towing water and provision barges to the dredges, which are often located forty miles from the nearest railroad point.

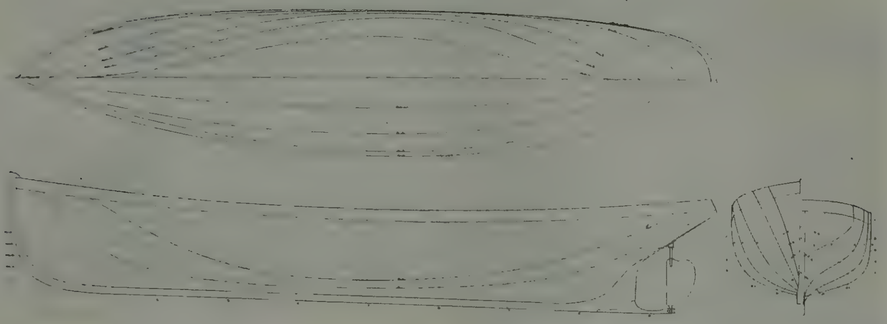
The interesting point about the installation is that the "Manteo" will probably have the smallest powered full Diesel engine of American design and workmanship in service today.

AN INTERESTING SUBMARINE CONTROL

Recently Mr. Morton, a Los Angeles attorney, held an interesting test with an 800-pound model of a submarine. A tank was built and the model placed in the water. At the touch of the key of the wireless, the model swam the length of the tank. The propellers were then reversed from the inventor's control station and the model backed up. An ether wave was then utilized to open the sea-valves on the little craft, and she sunk until only the antennae of her wireless apparatus showed above the surface. A small model torpedo was then shot from her bow, being released also by the wireless control.

While Mr. Morton may meet many difficulties in controlling a large submarine's movements from an aeroplane, his experiments have demonstrated the remarkable possibilities of distant control. His idea of the use of such craft in warfare is that boats of about fifty feet in length could be built, loaded with nitro-glycerine and guided by aeroplane into enemy mine-fields or into the entrance of the Kiel canal and exploded.

A model submarine being controlled electrically from a distance was recently demonstrated at Los Angeles. International Film Service Photo.

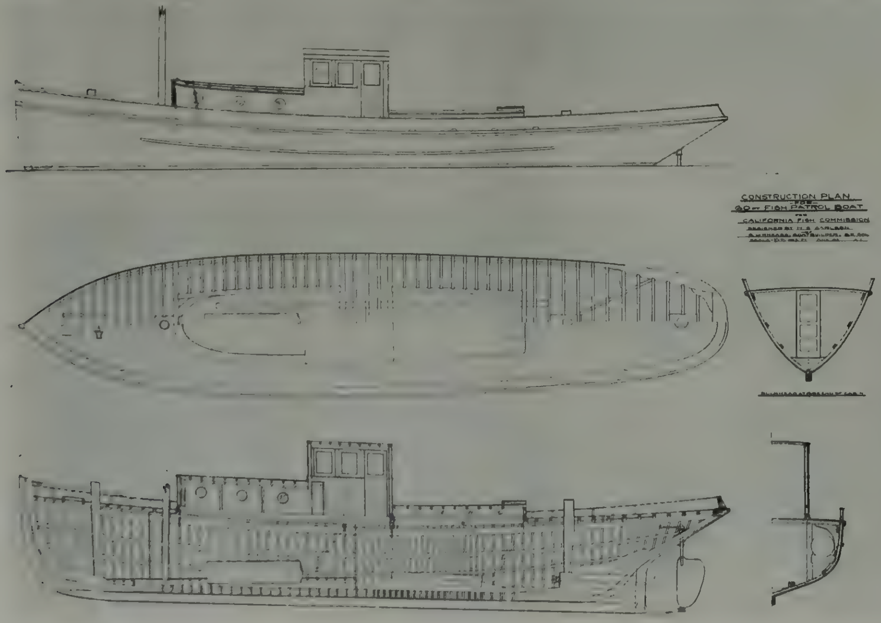


THE ACME'S FIRST INSTALLATION

The accompanying plans and lines are those of a patrol boat to be built for the California Fish Commissioners for use in southern California waters. The design is by Mr. H. G. Carlson, of the G. W. Kneass Boat Building Company, who has several fine craft of this type to his credit. One of the most interesting features of the boat will be the fact that she will be powered with the first commercial Acme engine, a 65-horsepower, three-cylinder unit, now being built at the Acme shops on Minna Street, San Francisco. The design of the Acme engine appealed very strongly to the engineer representing the Fish Commissioners, and the management of the new concern is naturally highly elated over his decision.

ADDENDA

In the August shipbuilding returns issued by the Pacific Marine Review, we refer to the ships building at the Peninsula Shipbuilding Company as being of the Ferris standard Government type. This is in error, as the Peninsula Shipbuilding Company is building to their own designs and the vessels are considerably larger than the Government standard and in our opinion a more satisfactory type of craft. These boats are 282 feet 8 inches over all, 267 feet 8 inches between perpendiculars, 48 feet 8 inches moulded beam and 27 feet moulded depth.



Launch of the "Levi W. Ostrander" at the Seaborn Shipbuilding Company's yard, Tacoma. This vessel was launched on July 31st and a sister craft was launched on August 30th.

Tacoma Notes

THE most successful launch of a vessel yet turned out at the Seaborn Shipbuilding Company's yards was that of the "Levi W. Ostrander," which was sent into her element the afternon of July 31st. The Ostrander was christened by Mrs. H. F. Ostrander, wife of Captain Harry F. Ostrander, well known exporter, and one of the owners of the Seaborn yards. At other launchings at this yard, the way of the vessel has carried them across a 550-foot channel, with the result that they have struck the opposite docks, but with no damage to the vessels. In the case of the Ostrander, she was made fast with enough steel cables and deadmen to check her way before she was two-thirds of the distance across.

The "Levi W. Ostrander," better known as No. 4 ship, is built under Lloyds specifications with a rating of A1 for twelve years. This vessel will not be equipped with machinery, but rigged as a five-masted topsail schooner. The fittings throughout on the vessel are very complete and intended for the comfort of officers and crew. The vessel is 260 feet long by 44 feet beam and 21 feet depth of hold. It is estimated that she will carry 1,750,000 feet of lumber. The vessel is under charter to Hind, Rolph & Co., of San Francisco, to carry a cargo of lumber to South Africa.

Wooden shipbuilding firms erecting plants are busy rushing them toward completion, while those having work under way are placing their best efforts toward rushing the work out. The Todd Drydock & Construction Corporation Company plant, the only steel shipbuilding plant so far here with material and means on the ground for steel work, is in condition to lay down its first work at the present time.

The Seaborn Shipbuilding Company, with offices in Seattle and Tacoma, and plant at Tacoma, the older yard of the wooden yards here, has work in sight for several years and one vessel reaching the launching stage about September 1st. The "Levi W. Ostrander," just launched, is being arranging for service, and the "H. C. Hansen," auxiliary schooner, from these yards, has undergone trial runs. Keels are laid for a number of vessels here.

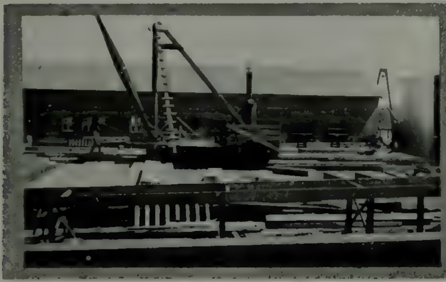
At the Babare Brothers' yards, old Tacoma, following an entire rearrangement of the plant, work is under way on several vessels and a large force of men is being secured for work at this plant.

The Wright Shipbuilding Company, recently organized here and located adjacent to the Seaborn yards, is one of the well equipped plants of the Coast. The frames are up on one vessel of standard design, while keels are laid for several other vessels.

The Tacoma Shipbuilding Company, with Edward Heath, well known Northwest builder, as superintendent, has a plant that can be altered with very little change to a steel yard. This plant, backed by Tacoma business interests, occupies a very advantageous location on an extensive tract of property owned by the company. At present it has four sets of ways and building berths with space for ten more, which will probably be arranged early this fall. The company has keels down for a number of vessels, and operators declare that there is no question as to the amount of business offering. This seems to be the opinion of all the yards.

To take charge of the different departments of the plant of the Todd Drydock & Shipbuilding Corporation, a number of builders from Eastern yards have arrived at Tacoma and taken up active work at the new plant, which is now reaching the stage where building is to be inaugurated.

At Old Town, Tacoma, Babare Brothers, who have long been noted as producers of high class cannery tenders, purse seine boats and other fishing craft, are just completing a large extension to their plant.



The space under the structure carrying the overhead tracks for the traveling gantry between the building berths, houses the air compressors. For further description of these pictures see the account of the plant on page 77

J. A. Eves, assistant manager, who is a recent arrival, is from the Sparrows Point yard and one of the well known marine men of the Atlantic Coast. C. L. Reed, superintendent of steel construction, is also a Sparrows Point man, while J. R. Meston, superintendent of machinery, is from Seattle and formerly engaged in business there. C. S. Holmes, secretary-treasurer of the company, is an old-time Pacific Coast Steamship Company man.

Following the strike among the mill and timber workers in the Northwest mills and camps, several of the shipyards became close pressed for lumber. On account of the uncertainty of securing Government work, and liability of yards being taken over if outside work was taken, the plants curtailed to considerable extent on securing lumber. When the situation clarified and builders began to see just how they stood, they were shy on lumber, and the strike came on at a most inopportune time.

In expanding their plant to permanently enter the field as builders of the largest sizes of wooden ships, Babare Brothers have paid particular attention to the economical handling of material in and about the building berths.

Government inspectors are now stationed at the Tacoma yards engaged in government building, supervising the work and checking on all material entering into the vessels. The builders declare that work is progressing very favorably on emergency vessels so far.

Cargo business offshore and coastwise holds very good at Tacoma. Wheat shipments from this port have shown an increase with some eight cargoes going out. Flour shipments have also shown an increase over the past year. It is expected that these shipments will continue during the fall. Business with the Osaka Shosen Kaisha continues good and the vessels have all the cargo they can handle. Car shortage during the early spring was a factor holding up freight movement for this line. J. T. Steeb & Co., representing the Garland Line, report full cargoes, both in and out, for the "Javary" and "Justin."

Threats have been made by I. W. W. workers to tie up the different Sound transportation lines, but so far without result. It is very difficult at present to secure working crews for the Sound steamers, especially where there is a great deal of freight to be handled. Operators are paying $50 and $55 per month and found for deckhands.

On account of a walkout among the shipbuilders at the plant of the Sloan Shipbuilding Company, work at this plant was held up for several days early in the month. The men made a demand for $6 per day on August 1st. This raise was made by the union yards at Tacoma and made an advance of 50 cents per day for eight hours' work over the former rate.

Captain T. S. Burley, manager of the Tacoma Tug & Barge Co., who has been away from Tacoma for several years and made his home in Portland, has returned to Tacoma. For the time being he has taken up active work with the company.

Captain Alfred Brotherton, one of the best known mariners along the Coast, died suddenly at his home in Tacoma recently. Captain Brotherton at the time of his death was 67 years of age. He was a native of Liverpool and had been a resident of Tacoma for the past eleven years. Captain Brotherton was responsible for securing the terminus of the Osaka Shosen Kaisha at Tacoma and had charge of the stevedoring end of the business here and for several years the piloting of the vessels. He is survived by his widow and two daughters, and one brother in England.

J. P. Ruddy, of the J. P. Ruddy company, ship chandlers, of Tacoma, has been very busy fitting out a number of the local and offshore vessels. Among the ships that he found in need of supplies was the tanker "Maricopa," "Potererillos," "Justin" and "Javary." Mr. Ruddy is one of the old-time young men in the ship chandlery business of Puget Sound.

It is reported that the Garland Line steamship corporation will add their steamer "Grayson," last reported on the Atlantic Coast, to their Pacific line, operating from Tacoma to Shanghai. J. T. Steeb & Co., customs representatives at Tacoma of the company and in close touch with the Garland officials, have not yet been advised. The company now operates the "Justin," "Captain Eckert," "Javary" and "Captain Renny" out of this port in the Shanghai trade.

The Pacific Steamship Company announces that the last steamer of the year to call at Knik Anchorage will be the "Admiral Watson," which will sail from Seattle on October 15th. Ice in Cooks Inlet generally prevents navigation after October.

WHITE BROTHERS BULLETIN

While there has been a considerable falling off in the demand of hardwoods for building and interior trim, this condition is more than made up by the requirements of all manufacturing industries and shipbuilding yards which are keyed up to the highest pitch. In these two lines the demand exceeds the supply. Government requirements are also using up a lot of hardwood lumber. All these points combined with the shortage of transportation facilities, hardwood stocks in the East shot to pieces, and buyers not knowing where to turn for what they want, cannot portend anything but the rising of prices to higher levels.

The military draft may have some effect on the hardwood producing and consuming industries but it is hardly thought that this influence will be an appreciable one, that is, in reducing the supply of available labor. We are a country of over one hundred millions and the withdrawal of a few millions of men from industry, being only a small percentage of the whole, is not likely to cause any appreciable lessening of production, especially after the necessary readjustments are effected.

There is another factor, however, which will very likely have a most pronounced effect upon the hardwood lumber business and that is the car shortage which we are practically certain to have within a few months. The crops this year are abundant and the demand for cars to move them will be greater than in previous years. This, coupled with the extraordinary demands to be made by the Government for the movement of supplies and troops will, it is believed, create a condition which will in all likelihood be worse than any car shortage we have heretofore experienced.

This condition will be alleviated in some measure by the fact that the railroads are building a great many cars, in fact, new cars are now rapidly and continually coming into service. The brightest ray of hope, however, is the fast that Pacific Coast dealers in hardwoods have been most active in replenishing their stocks and in keeping them up to standard. Principally owing to the fact that the market has been a rising one for some time past, the San Francisco hardwood dealers have bought most extensively and the stocks on hand at the present time in San Francisco are sufficient for the needs of the Pacific Coast for some time to come.

REGARDING THE DESIGNING OF SCREW PROPELLERS

By Raymond E. Lovekin
Managing Director, American Screw Propeller Company

The fact that many marine engineers and naval architects in designing propellers use a great deal of guess work is well known, and is admitted to be so by many of the aforementioned individuals. Realizing that such a condition exists, it, indeed, seems most discouraging that such an important part of a vessel as the screw propeller does not receive the careful study and attention which it deserves. Of course, there have been a great many fairly efficient propellers designed by comparative and guess methods, but where the deviations of hull and power conditions are great, these methods resolve themselves into a conglomeration of useless and unreliable data.

With the above facts confronting all those interested in making a vessel a great success, there are still those who believe that a "good enough" propeller, which will merely produce the desired speed with a given horsepower, can be designed by the comparative or guess methods. In many instances such a propeller has been designed, but it is not realized that a propeller designed by the proper authorities would attain the desired speed with less horsepower, thus cutting down fuel consumption, initial weight of propulsive machinery and space required for the same; all of which resolve into a saving of money. For the information of all those interested in efficiency, may it be stated that "the propeller should be the starting point for the designing of marine propulsive machinery," for it is only after this element is correct that the designs for engines and boilers will follow along in logically efficient lines.

The many failures which have existed in connection with propulsive problems have been due to the ignorance of the propeller designer in not realizing the importance of his work, and it may be stated that it is a known fact that approximately sixty per cent of the vessels now in use are capable of being made more propulsively efficient. This fact, at first, may seem rather alarming, but it has been found to be true by modern authorities who have analyzed many of the screw propellers designed up until a short time ago. Such failures are not generally known, due to the fact that the vessel attains her required speed, and furthermore, because an efficient trial trip (from which reliable data can be collected) was never run. This later fact is in most cases true in connection with wooden motorships, auxiliary schooners and other lesser important vessels.

The most important and useful item in connection with screw propeller designing is "the effective horsepower curve," which gives the necessary horsepower to pull a hull through the water at different speeds. Of course, it requires time and a slight expenditure of money to secure this curve, but the value of it can be readily attested to by modern authorities. If such a curve was more generally used, and in the hands of proper authorities, the many failures which have existed could be greatly reduced.

In summing up the above as a whole, the question as to "who can design propellers of the highest efficiency" will no doubt arise. The answer to this is quite simple, as there are several individuals and one company which have for their sole occupation the estimation of power for propulsion of vessels and the designing of screw propellers. The services of the aforementioned can be secured very readily and at a very moderate cost, and it would be advisable for all those who are interested in eliminating waste of power, time and money to get in touch with said parties and profit by their experience, knowledge and equipment.

The designing of a proper screw propeller, as every engineer knows, is a difficult task and requires the above mentioned assets; for without these it is almost impossible to obtain the high propulsive efficiency sought for by most engineers and attained by so few.

This article is by no means meant as a reflection upon the ability or knowledge of the average marine engineer, as the designing of a proper screw propeller is today recognized as a very scientific problem and requires much data, knowledge and experience. Furthermore, the average engineer or naval architect does not have time to specialize upon one subject, due to the many other branches of his profession which he is required to handle.

May this article serve to make more engineers and naval architects take a greater interest in screw propellers and propulsive problems.

The Winslow Marine Railway & Shipbuilding Company recently completed a scow specially designed for handling soya-bean oil, which is forming an ever-increasing item in the cargoes of Oriental steamers. The scow is equipped with two steel tanks for holding the oil and will gather up small shipments for conveyance to steamers.

The estate of John S. Hyde has disposed of the famous Bath Iron Works to a syndicate of Maine bankers. Mr. William T. Cobb is president of the new concern. Nine torpedo-boat destroyers are on order here for the Government.

Personals

CAPTAIN LEB CURTIS, marine surveyor, formerly of the Board of Marine Underwriters of San Francisco, has opened offices at 310 Sansome Street, San Francisco. Captain Curtis has made a splendid record on salvage operations, notably on the saving of the German steamer "Walkure," and his friends are predicting a splendid success for him in his chosen field.

Mr. J. Hamilton Cruger has been appointed inspector for the U. S. Shipping Board at San Pedro. The vessels directly under Mr. Cruger's supervision will include four wooden vessels from the Hough plans building at the Fulton Shipbuilding Company and two Ferris-plan boats building at the R. J. Chanler Shipbuilding Company's plant.

The following is a correct list of the men in charge of shipbuilding for the United States Shipping Board in the different coast districts:

W. H. H. Hand, Jr., Customhouse, Boston, Mass. East Massachusetts to Maine, inclusive.

Eads Johnson, 115 Broadway, New York, N. Y. New Jersey (outside the Delaware river), New York and to East Massachusetts.

G. R. McDermott, Room 302, 1319 F Street, N. W., Washington, D. C. Chesapeake and Delaware, and Atlantic Coast from Philadelphia to Norfolk.

W. C. McGowan, 505 Heard Building, Jacksonville, Florida. North Carolina, South Carolina, Georgia, Atlantic and Gulf Coast lines of Florida to and including the Apalachicola river on the west.

Warren Johnson, 717-18-19 Hibernia Bank Building, New Orleans, La. From the Apalachicola river on the east to but not including the Mississippi river on the west.

Charles N. Crowell, 1316 Carter Building, Houston, Texas. Texas and the Mississippi river.

A. F. Pillsbury, 310 Sansome Street, San Francisco, Cal. Pacific Coast.

John F. Blain (under Captain Pillsbury), Securities Building, Seattle, Washington. Seattle and vicinity.

Mr. C. W. Norton has been appointed contracting freight agent for the Pacific Steamship Company to succeed Mr. A. F. Woolsey, who has been called to the naval reserve.

Mr. H. R. Johnson, formerly traveling steward for the T. K. K., left for the Orient on the Persia Maru, August 10, to take care of the commissary department of the Hotel Oriental at Kobe.

Mr. William M. Moran, one of New York's best known freight traffic experts, formerly traffic manager of the New Haven Transportation Company and the Keystone Coal and Coke Company, is now traffic manager of the Cullen Barge Corporation of New York City.

Mr. Carlos De Zafra, M.E., has resigned from the service of the Telautograph Corporation to accept the appointment of Naval Constructor with the Foundation Company with headquarters in the Woolworth building, New York.

Mr. Farnum P. Griffiths, admiralty lawyer, has been appointed by the recruiting service of the United States Shipping Board, as section chief for California of the free government schools in navigation that are being established in San Francisco, San Diego and San Pedro. The position is a patriotic one and carries no compensation.

Mr. L. J. Wentworth, president of the Portland Lumber Company and Oregon representative of the Federal Shipping Corporation, is now in charge of the new offices of the Emergency Fleet Corporation in the Oregon building, Portland.

Mr. Charles E. Morgan, secretary and treasurer of the Proenix Ship Knee Company, a well known Portland concern, passed away during the early part of August.

Mr. W. H. Curtis, naval architect and marine engineer, has moved into new quarters on the ninth floor of the Lewis building, Portland, Oregon.

Mr. Washington Irving Babcock, one of New York's most highly respected and well known naval architects died at his New York residence on August 7th. The practice built up by the late W. I. Babcock, will be carried on by Babcock & Penton with offices in the Penton building, Cleveland, Ohio.

DEATH OF E. K. WOOD

In the death of Mr. E. K. Wood, on July 30th, San Francisco, and in fact the whole Pacific Coast, suffered the loss of one of the men who have taken a really constructive part in the development of this section of our nation. Mr. Wood came to San Francisco forty-five years ago and established the E. K. Wood Lumber Company, which rapidly developed into one of the largest lumber concerns in the world. Besides erecting mills and developing great lumber holdings, Mr. Wood built up a large fleet of coasting steamers to handle the products of these mills, and at the time of his death the "E. K. Wood" fleet had grown to include no less than twelve vessels. The deceased was a progressive citizen and took a keen interest in many affairs and projects outside of his main business of lumber and shipping. His death will be keenly felt in many circles and his development work on this Coast will bear testimony to his genius for many years to come.

FIREMAN'S FUND
Insures Hulls, Cargoes,
HEAD OFFICE: CALIFORNIA AND SANSOME

JOSEPH HADLEY, European Agent
3 LOTHBURY, E. C.
LONDON

G. KIRKHAM SMITH, Special Agent
407 LEWIS BUILDING
PORTLAND, ORE.

FRANK G. TAYLOR, GENERAL AGENT FOR WASHINGTON, OREGON, ALASKA

Marine Insurance Notes

FROM advices received from the East it would appear that the Emergency Fleet Corporation is having, or is likely to have, some difficulty in arranging builders' risk insurance on the various vessels to be contracted for by them, which is quite in line with other problems which must be met by that corporation.

It appears that, prior to the resignation of General Goethals, a subcommittee of the American Hull Underwriters' Association, which committee had to deal only with builders' risks, was called into consultation with reference to such insurance, and certain tentative proposals and agreements were made, having in view, from the underwriters' standpoint, the insurance of all vessels contracted for by the Government under the emergency plan. Subsequently the Corporation appointed an Insurance Committee to arrange for this insurance, and it was agreed by the companies writing this class of insurance that the rate to the Government would be two-thirds of the then quoted rates for builders' risks with no commissions or brokerages, and with the proviso that the Government would carry fifteen per cent of the amount required. This latter provision the Government declined, stating that it required full insurance, and further negotiations were necessary.

Later it developed that the rates quoted by the American Hull Underwriters' Association were based on the risks to be met with in established yards, where the riks were well known and, owing to the experience of the builders, would be minimized, and that owing to the mushroom growth of new shipbuilding plants, without experience and without established yards or facilities, a revision of rates would have to be made, which revision would naturally be upward. Further than this the Insurance Committee of the Corporation found itself hard against the laws of certain States, particularly those of Oregon, which provide that insurance of all property in the State must be placed with agencies of companies duly authorized to transact insurance business in that State, and that the gross premium shall be paid to that agent who is prohibited from rebating to the assured or a broker.

It further appears that the Government cannot guarantee that the insurance companies accepting this risk may not be able to participate in the insurance of all of the boats contracted for, as some of the contracts are let with the provision that the builders themselves will take care of this feature. If, however, the Government can arrange for a wholesale rate lower than the going rate for isolated cases, the builders would naturally take advantage of the arrangement, and thus the companies would be assured of a line on all boats building.

In the meantime the English market seems to be receptive for this class of business, and unless our American companies rise to the situation, and the individual States also, and show their patriotism we will see another example of the Government rising superior to itself, first in chartering foreign bottoms to carry coal from one American port to another, which is contrary to the laws of the United States, and won in placing insurance in foreign companies, which is also contrary to the law.

WAR RISK INSURANCE

Another interesting decision has been handed down in England as to what, or rather what does not constitute a loss under war risk insurance.

It appears that the steamer "Sherwood" was covered by the North of England Protective and Indemnity Association against war risks only, and that the owners had no insurance against ordinary perils of the seas. This steamer, while on a voyage from London to Scotland, collided with the wreck of the steamer "Fulgens," which, on that same day, while on a voyage from Hartlepool to the Thames, was torpedoed and sunk off the Norfolk coast by a German submarine. The "Sherwood" sustained considerable damage, and claim

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O. G. ORR & CO., Managers
ATLANTIC MARINE DEPARTMENT
37-43 WALL STREET . NEW YORK

AND BRITISH COLUMBIA, 264 COLMAN BUILDING, SEATTLE, WASHINGTON

was made against the Protective and Indemnity Association for the cost of repairs, on the ground that the damage was the result of the consequences of hostilities, a risk which was covered under the protection policies.

The Court, in giving judgment for the defendant, draws, it would seem, rather a fine line, and yet the argument as to the proximate cause would seem to be sound.

The Court said that had the "Fulgens" been sunk at the entrance to a narrow harbor, the sinking not being a desire to destroy that vessel only but to block the harbor and to damage other vessels attempting to make the entrance, he would consider the damage to the vessel attempting to enter the harbor as the result of hostilities, but in this particular case the "Fulgens" was the sole object of the attack, and that her destruction, and that only, was the objective of the enemy boat. The colliding of the "Sherwood" with the wreck was a mere incident, that all vessels in navigation must take the risks of colliding with derelicts or wrecks, and that the damage in this case must be attributed to a peril of the sea.

Freight Report

By Page Brothers

OUR last was dated July 16th, since when shipping has been handicapped further by lumber strikes up North, and vessels now in Australia chartered for coal and copra are also being detained for the same reason. Sailers arriving and chartered and those loading already for foreign ports from the North are being held up by strikes, making it almost impossible to buy lumber for prompt loading. However, said tonnage is so scarce that not many are to be had; therefore, rates have not weakened at all. In fact, several late charters have been done at higher rates than prevailed a month ago, especially to the West Coast, and as high as $40 per thousand feet has been paid for several steam schooners. For Australia, sailers have been recently chartered at $37.50 Sydney per thousand feet for very late loading this year, and same is bid for next year.

For the Orient, only a few steamers have been fixed, among them the motorship "Brazil," reported at about $230,000 for one round. The motorship "Australien" went on the berth for Japan and/or China and closed for a return cargo for a lump sum equal to $450,000 based on 8500 tons cargo capacity. Steamer "Volund" taken at $40,000 lump sum, hence to Kobe, September/October. The steamers "Kaijo Maru" and "Kenkon Maru" both re-let on private terms.

Several sailing vessels have been sold at enhanced prices, among them the barkentine "Amazon" at $160,000 to a Gulf of Mexico buyer, she having been sold for $55,000 in June, 1916. The barkentine "J. M. Griffiths," $30,000, sold at the same time for $15,000, the schooner "M. Turner" at $107,500 net, and several small ones, all at increased prices.

The motorship "S. I. Allard" has completed her run to Australia making the trip from Astoria to Honolulu in 13 days and from Honolulu to Sydney, Australia, in 26 days. This gives an average run of 223 miles per day which is, if anything, a little better than the average tramp steamer time. Reports from the vessel indicate that the engines worked smoothly throughout and that there were no unusual incidents attached to the voyage. The "Allard" is powered with two 320 horse power Bolinder engines.

Old and New China

TWENTY years ago much was written about the "Yellow Peril." Political prophets drew fanciful pictures of what would happen to humanity when China, the sleeping giant among nations, awakened. China was a nation that embraced more than one-third of the population of the world, of immense vitality and great colonizing power, rich, cultured, and possessing a civilization far antedating the United States. The abundant cheap labor, when taught factory methods, could swamp the world with their products. Ample raw material, low in cost, low cost of living and a few wants would make it almost invincible.

Some years ago I was one day talking to a high Chinese official about China, and he said: "You foreigners are doing your utmost to arouse China, and once she awakens, she may move forward so rapidly as to make you regret that you disturbed her."

The awakening came with the first revolution of 1911-12. New life has breathed in this new empire. Her statesmen have been convinced—reluctantly convinced—that if China is to retain her place among the independent Powers she must be modernized. See the men-of-war she now has, with more building, and her great army improvements. The people more and more realize that the coming of these changes mean also the coming of national and social gain. The land which once opposed all railroad construction has now several thousand miles of the finest railroad lines in the world, and thousands of miles are now under construction, being financed by the English, German, French, Belgian and Japanese syndicates. I don't think that any railroad in China, apart from a portion of the Hankow-Canton line, has American capital.

Daily newspapers are published in every large city where the population is over 50,000, to meet the desire for wider knowledge. Chinese magazines are printed and sent all over the country today. The old educational system has gone, and in its place Western methods have been introduced. The old type of "brave" soldier armed with antiquated weapons has been superseded by trained soldiers equipped with modern rifles and quick-firing guns. Chinese commerce has taken an upleap both in imports and exports. New sources of wealth have been opened. The Soya bean, Manchuria's great product, is found to be of great value, and exports of it valued at millions of dollars are now being shipped to Europe and America every year. Chinese coal is being shipped to the Pacific coast of America, and many men learned with surprise that Han-yang iron has been sold and is still selling on the Pacific slope in competition to the great American tourist. China has awakened to the great possibility of her national destiny, centralizing her government and extending her power over the outlying portions of her empire.

Few men have had the opportunity of seeing the vast improvements the writer has seen during his long residence in China and his extensive travels from province to province. Perhaps the best evidence of change that has overtaken China is to be seen in Peking itself. Picture the Peking of today with the Peking before the Boxer rebellion fifteen years ago. Then foreign houses were few. The streets were among the worst in the world. They were simply made by throwing up earth on either side of the roadway and leveling it off. They made no foundation, and the pits from which the earth was taken soon became mudholes, and after rains traffic was almost impossible and ponies had to move warily lest they be swallowed up. These streets were narrow, with lines of booths on either side. As the European walked along he was frequently exposed to insult. There were no police. A number of Yamen runners, rascals attached to the minor magisterial courts, were supposed to do police duty.

Today you reach the capital by a comfortable railway, you stay at the Grand Hotel de Wagon Litz, you drive from the heart of the city to the Summer Palace in a motor car along a macadamized street lighted by electricity and guarded by uniformed and disciplined police who are stationed at regular intervals along the line of route and on all corners directing the traffic. The legations are mostly housed in palaces erected since the revolution. There are banks, American, British, French, German, Russian, Japanese, and Chinese, fit for Wall Street. There is a considerable foreign community, including a few thousand foreign troops. The number of foreign-built houses used as private residences are increasing daily, and the well-to-do Chinese are moving into them rapidly. Several Chinese princes who were thrown out of office when the republic came, have built mansions and are living in them today. In the Summer Palace itself there is a foreign-built pavilion. In the dry goods stores, which carry a fair assortment of all foreign lines, can be found all necessary articles for the tourist. There is on sale a whole variety of daily and weekly newspapers and magazines from all parts of the world, most of the newspapers having Reuter's telegraphic service. Peking has schools of all grades. In the prisons the worst feature of the old-time torture has been abolished, but there is still room for further reform.

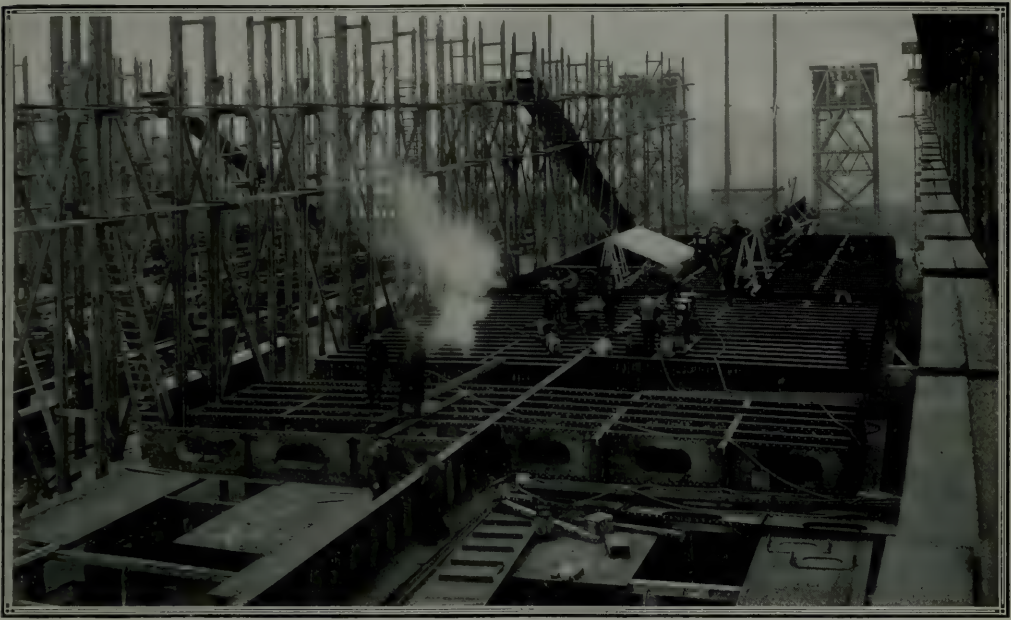
In China the old and the new will be found side by side on the great interior waterways. China's waterways form one of her greatest assets and will play an important part in her future development.

The former Foreign Office, the Tsung Li Yamen, was a low group of obscure buildings, and the chief feature of the Minister and Staff generally was their ignorance of foreign affairs; for with rare exception they had never been out of China. Today the Ministry of Foreign Affairs, the Wai Wu Pu, occupy the finest and most dominating building in the city. This building was designed and built by an American architect, Mr. C. D. Jameson, and among its members during the last few years have been some of the ablest. Mr. Liang Tung Yen was a graduate of Yale. Another was Dr. Wu Ting Fang, who graduated from Lincoln's Inn. In the English department there are men who graduated from Cambridge University, Harvard and Yale and attended the American and London Schools of Economics.

A modern railway bridge over one of the Flowery Kingdom's rivers. Examples of modern engineering practice are found scattered amid the even more marvelous achievements of the early Chinese engineer and builder.

The junk is still an all-important vehicle of trade throughout the Orient. These vessels are by no means bad sailers, are well built and ably handled by their Chinese crews, the country affording a great wealth of good sailormen.

Take, for instance, China's salt industry, before the revolution and after. Under the old regime the government got only half of what was actually collected. Since the revolution, this industry was put up as security for the £25,000,000 loan



Efficient Men Demand Durable Air Hose

THE enormous increase in the use of Glide Air Hose in ship construction is, of course, largely due to the extraordinary value of the hose.

But no small part of its reputation with superintendents and foremen is its popularity with the men who use it.

Almost without exception these men are paid on a piece-work basis.

The blowing out of a lead means an idle "gun," means time taken away from work, means reduced wages and dissatisfaction with equipment and rates.

Glide Air Hose greatly reduces blow-outs and eliminates those due to the defects of inferior hose.

It keeps the men satisfied.

Because of its superior construction and the high-grade materials used it goes still farther.

It facilitates swift and efficient work.

Its modeled construction does away with the annoying, time-eating "kinking," too common with many types of wrapped hose.

The carefully compounded material of which the inner tube is made resists the rotting effect of the oil vapor from the compressors.

The tough and durable outer cover is especially compounded to withstand the dragging wear which shipyard air hose must be especially designed to resist.

No factor in efficient construction and durable materials has been overlooked.

Glide Air Hose keeps down overhead. It keeps efficient labor satisfied.

We can make immediate deliveries from our branch in your city.

Goodyear Porthole Rubber can be cut to any size desired. And it can be supplied quickly. It is a quick and durable compound designed to give a maximum of service on portholes and hatches.

Goodyearite, the high-pressure superheat packing, is made of long fibered asbestos compacted with a minimum of binder, especially designed as a standard packing for marine use. Our branches carry stocks.

The Goodyear Tire & Rubber Co., Akron, Ohio

GOODYEAR
AKRON

which China borrowed from the foreign powers (America not participating), and today, under the new administration headed by Sir Richard Dane, the government is collecting something like $10,000,000 per month.

China now has its own steamship lines, dockyards, iron and steel mines, all run and directed by Chinese managers. The Hanchow-Shanghai-Ningpo Railway was entirely constructed by Chinese engineers, the steel bridges, cars and other equipment being built and manufactured in China; also the Peking-Kalgan railroad, built by Dr. Jeme of Yale-Sheffield.

All along the railway lines new prosperity shows itself. The trains are crowded with passengers; hotels have sprung up, and when an old house is pulled down it is to make room for one of a modern type. The railroads have made the country people travelers, and travel means broadened ideas and the breaking down of old prejudices. One district sees another benefit from the railway and are today clamoring for one of their own; hence

A graceful bridge of cut stone. No finer examples of engineering skill exist anywhere than some of the beautiful Chinese planned and Chinese built bridges. The stone fitting on many of these bridges is absolutely perfect.

Hand pumping, despite the spreading use of the gasoline and oil driven pump, is still the most widely used mode of irrigating the great paddy rice fields. This is but one phase of the engine builder's opportunity in old China.

A great deal of shallow water is found along sections of the Chinese coast, and in many places the surfboat and lighter are the only means of communication with visiting steamers. The Chinese recruited from the fishing population are fine boatmen.

Madison-Kipp Lubricators

VALVELESS FORCE-FEED

They Safeguard Shipowner and Enginebuilder Both

TO many a marine enginebuilder the outstanding fact about the **Madison-Kipp Lubricator** is that it gives him assured control over the lubrication on his engines **even after they have passed out of his hands.**

By means of the Madison-Kipp **fixed** adjustment feature he can dictate the minimum amount of oil to be delivered to every part during the engine's entire life.

These lubricators give him the additional security of a never-failing supply of fresh, "live" lubricant only, because their positive force-feed will pump oil against pressures of 2,000 pounds to the square inch.

Their valveless construction insures freedom from trouble and absolute certainty in oil delivery.

THEY PROTECT REPUTATION

They give the engine builder definite assurance of proper lubrication—and there is no single item more important in winning and maintaining reputation.

Too often defects and failures of lubrication cause engine troubles that are wrongfully charged to the design and material of the engines.

Madison-Kipp Lubricators eliminate such defects and failure and the consequent unmerited blame.

They safeguard the reputation and performance of the enginebuilders' product.

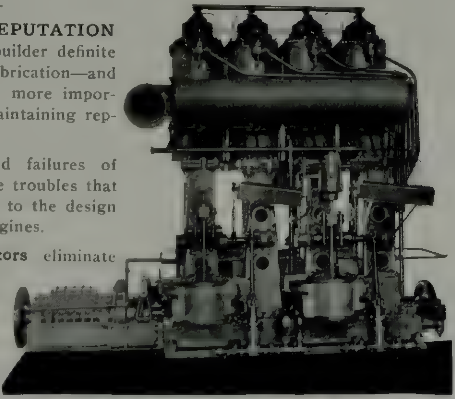
THEIR USE IS SWIFTLY INCREASING

Undoubtedly the great increase in the construction of hot-ball, Diesel and allied types of engines has had some effect in rapidly increasing the use of **Madison-Kipp Lubricators.**

For engines of these types undeniably exact a perfection of lubrication not attainable without the valveless force-feed principle of the Madison-Kipp.

But even in simpler types of marine engines and auxiliaries these Lubricators are being used more and more.

They offer advantages to the shipowner as great as those offered the shipbuilder.



THEY DIMINISH OIL CONSUMPTION AND REPAIRS

Madison-Kipp lubrication economizes oil.

The feed-adjustments of these lubricators can be easily and accurately made, so that waste is eliminated.

Even more important than the oil-saving is the reduction in repair time and costs.

Without the certain and adequate Madison-Kipp lubrication, bearings often suffer seriously through improper or vitiated lubrication, causing repairs or rapid depreciation.

So Madison-Kipp Lubricators safeguard the shipowner against excessive oil costs, swift depreciation, and grave repair charges.

IMMEDIATE DELIVERIES IN ANY SIZE

We are making immediate deliveries of thousands of Madison-Kipp systems, ranging from 1 to 50 and more units each.

They are used not only on Marine Engines but also on heavy tractors, steam hammers, dredges and air-compressors.

The factory in which they are made is the largest factory in the world devoted exclusively to lubricator manufacture.

We will gladly furnish any desired information, including blueprints and the like.

The Madison-Kipp Lubricator Company

MADISON, WISCONSIN

the ever increasing demand for new railways, and today is the opportunity for American capitalists to get into China and build railways and thus secure some foothold and their share of the business of imports and exports of China. Owing to the European war, the nations now involved will be financially unable to finance large undertakings in China for some years to come, and America should not miss this great opportunity.

While there is much that is imperfect, much that is disappointing, and much that can only admit of qualified praise in the present condition of affairs, I fully believe that the new republican government, on the whole, is strongly making for good. Corruption, as has existed, cannot continue unchecked when exposed to the light of publicity. No records were kept, no accounts presented, in the olden times, but now that unhappy state must cease in the presence of public inquiry and public condemnation. So rapidly has the press gained influence that time and again officials have sought to purchase control or to try to close them.

Most of the large cities in China now have electricity, and several have street-car service, but most of these enterprises have been financed by English and German capital. The success of the English and Germans in all of their undertakings in China compared to that of America lies in this very interesting point: The English and German firms send their representatives to the Orient for one or two years to study the conditions of trade and to become thoroughly familiar with the people, their needs and their habits. Their men are well provided for and able to meet every price and article which the Oriental requires. The American sends his representative to the Orient expecting him to write up thousands of dollars' worth of business in the first six months or so. In many cases these men were never on a ship in their lives and never saw an ocean. The line of samples he carries along with him are of goods used in America and not adapted to the Oriental trade at all. When this man arrives at the first port he is an entire stranger and does not know where to begin, but puts up a brave front and starts about his business as they do it in America, and the success with which he meets is usually heartbreaking, and the farther he goes the worse off he finds himself. This is not the fault of the representative, but absolutely due to his lack of knowledge of the way business is conducted in Oriental countries. The American manufacturer has yet to learn the ways peculiar to the Oriental before he can hope to make a success of business in the Far East.

I have spoken with many business houses in America of their experiences in China, and they all tell me the same story. They have no one to blame but themselves, as they do not know how to handle this trade, and they also show the same ignorance in the export trade from China. They send men out to do their buying who have absolutely no knowledge of the country and with whom they have to deal.

I was recently talking to the manager of a business house in San Francisco who told me they had just sent one of their staff out to China to purchase antimony in Chungking and that he would proceed to Shanghai. He had an idea that Chungking was about fifty miles from Shanghai and that there was an easy means to reach the former city. When I informed him that Chungking was some thirteen hundred miles or more from Shanghai, and that all the freight from that city had to come down the Yangtsze river by native junk to Hankow, and then by river steamer to Shanghai, his plight was a serious one, and he had to spend a considerable amount of money for cables in reaching his representative, advising him where to go for proper and reliable information. This is only one of the many instances of the American ignorance of the Orient with which I have met during my travels in the United States and the Far East.

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A large stock of all sizes on hand for

IMMEDIATE SHIPMENT

Special prices on carload lots for direct shipment from Eastern Mill

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"Imperial" Flood Light Projectors throw a strong steady beam of light that can be directed and regulated at will to illuminate both moving and stationary objects.

They are particularly suited for patrol boats and to light up surroundings of places under guard, such as channels, canal locks, anchorages, manufacturing plants, aqueducts, arsenals, bridges, etc.

By their use outdoor labor or sports can be continued at night the same as in daytime; painted signs are made 24 hours efficient, and all details of sculpture and architecture are clearly brought out.

"Imperial" Flood Light Projectors are made in many distinct types to meet requirements and in sizes to take flood lighting Mazda lamps up to **1000-Watt, 105 to 130-Volt.**

Write for Projector Bulletin No. 303. It gives complete information and is Free.

Type SDY Projector

Type SCX (1000-watt) Projector

CROUSE-HINDS COMPANY

SYRACUSE, N. Y., U. S. A.

NEW YORK BOSTON CHICAGO

Another poor feature of the American method of foreign trade is the lack of American banks in the Orient. Most of the import and export finance has to be done through English banks.

Attached I am giving a brief report of each individual province of China and through which I have traveled:

The Northern Provinces are Kansu, Shensi, Shansi, Honan, Chihli, and Shantung

Kansu.—Area, 125,438 square miles. Population, 10,386,000. Capital is Lanchowfu, situated on the Hwang Ho river and on the great trade route between China and central and western Asia. Transit trade is the chief wealth of this province. Two crops are produced each season of wheat, millet, sorghum and rice. This province is famous for its production of rhubarb. A line of railroad has been projected and a small portion is under construction. This line has stopped work for want of capital.

Shensi.—Area, 75,290 square miles. Population, 8,450,000. The population in this province is concentrated mostly in the Wei Ho valley. The northern part is fertile tableland, but the uncertainty of rainfall makes agriculture very precarious. The southern half is very mountainous except for a rich valley on the upper Han. In the north peas, beans, rape seed, millet and maize are grown. In the south, large quantities of fruit are grown. The capital of this province is Sianfu, a former capital of China. There are two lines of railway under construction, both crossing the capital.

Shansi.—Area, 81,853 square miles. Population, 12,200,000. This province has immense wealth in coal, as yet hardly touched, and its soil only needs regular rainfall to insure good crops. Side by side with the coal is iron. Roads and railroads need development. Shansi is a second Pennsylvania. The capital city is Taiyuanfu. Other important cities are Hweihuating, Fenchowfu, Kiangchow, Tsechowfu, and Pingtingchow.

Honan.—Area, 67,954 square miles. Population, 25,317,820. The river Whang Ho divides the province into two parts. This province is immensely fertile, and it was this province which gave the name of "Central Flowery Land" to China. This province also has coal and iron resources of great value which need capital to develop. The capital city is Kaifengfu, formerly a city of great importance. The main line of the Hankow-Peking railway runs from south to north of this province. Other lines are needed to develop the mineral resources of this place.

Chihli.—Area, 115,830 square miles. Population, 21,000,000. This province is largely a plain on which is grown corn, millet, beans, peas and sesamum. There are also large coal and iron deposits in this province as yet untouched. The capital is Paotingfu, a military center and a former home of the present President of China, Yuen Shih Kai. The Hankow-Peking railway also runs through this province from south to about the middle, where is situated the capital of China, Peking. Other important cities are Tientsin, the great northern port of China; Kalgan, Shanghai-Kwan, Kaiping, Tongshan, and Taku. The last mentioned port is famous for its salt production. In this province are the largest coal mines as yet developed in China, known as the Kalhan Mining Co. and owned by the British.

Shantung.—Area, 55,984 square miles. Population, 38,247,900. Very mountainous and highly diversified. The west is a plain and the east is a peninsula portion. The coast affords good harbors, namely, Tsingtau, Chefoo, and Wei-hai-wei. Farming is the principal occupation of the people. There are valuable mineral deposits in this province, and some are being worked with German capital. The capital city is Tsinanfu. The main line of the Tientsin-Pukow railway runs through a section of this province, touching at the capital of Tsinanfu, and from there the Germans built a line, some 400 miles in length, to Tsingtau. There is large room for other lines in this territory which would touch the other principal cities, namely, Techow, Tsingchow, Weihsing, and Yenchow.

The Central Provinces are Szechwan, Hupeh, Hunan, Ki angse, Anhui and Kiangsu with Chekiang Loosely Connected

Szechwan.—Area, 218,533 square miles. Population, 68,724,800, giving a density of 314 people to the square mile. This province is one of the richest in China, both in vegetable and mineral products. It is well watered, and internal communication is fairly good. The upper gorges of the Yangtsze river run through the southern portion of this province. There is a railway under construction which will run right through the center portion touching at the capital, Chengtu, then south to Chungking. There is also a proposed railway which will run from the capital up to the north of this province to Shensi. Other important cities in this province are Chengking, Kaiting, Suifu, Wanhsien, and Tatsientu. The southern portion is rich in gold, copper, zinc, coal, beans, maize, and wax. There is no regular means of getting these products to shipping points, all having to come down by cart or wheelbarrow to the upper Yangtsze then by boat to Shanghai. More railroads are badly needed here. The northern section is also rich in gold, coal, ground nuts, potash, silk, sufflower, goat skins, tung oil, wheat, tobacco, tea, hemp, ramie, and iron. There are no railways through this northern section, which is slightly mountainous.

Hupeh.—Area, 71,428 square miles. Population, 35,000,000. This province consists largely of two valleys, that of the lower Har in the north and

? What is Preservo ?

Most vessel owners and shipbuilders on the Great Lakes know Preservo and know it thoroughly. Many owners and builders on the seaboards use Preservo exclusively for weatherproofing their canvas. But there are a few, who, through no fault of their own, have never learned about Preservo—and so this advertisement is addressed to them.

A REAL PRESERVATIVE

Preservo is a chemically inactive impregnating solution with a natural affinity for vegetable fibre.

The **preservative** base of **Preservo** rests upon several **inert** gums, which have a **chemical affinity** for **cotton fibre** and which are incorporated with a non-volatile carrying vehicle of powerful antiseptic properties.

The **preservative** gums **penetrate** and **seal** up the cotton **fibres**, for which they have a chemical affinity, against the **introduction** of moisture. Hence the cause of canvas **decay** is **prevented.**

The powerful, non-volatile antiseptics **impregnate** the fabric and prevent deterioration from mildew, **insects** or other destructive surface agents.

Both gums and antiseptics are moisture repellants and preservatives. Hence **Preservo** preserves canvas fabrics from **within** and **without. Preservo prevents** spontaneous combustion and is an efficient deterrent to fire.

A REAL WATERPROOFING

Preservo is the only waterproofing solution known to science that **permanently waterproofs canvas** even to the complete saturation and penetration of each little cotton fibre.

Paraffine, linseed oil and rubber compounds **do not penetrate** the **fibres** of canvas fabric—they merely coat the fabric.

Upon the slightest disarrangement of the strands of yarn, channels are formed for the moisture to **enter, soak,** and **eventually destroy the entire fabric** as moisture follows cotton fabric by capillary attraction, on the same principle as coal oil is sucked up by a lamp wick during combustion, or a blotting paper absorbs moisture.

Preservo, however, **penetrates** the fibres—fills them with a strengthening solution. **Each fibre stands alone—proof** against moisture.

Preservo means **life** to the canvas—preserves it against decay as well as moisture. **Preservoed** canvas is not affected by heat, cold, rain, snow, hail, sleet, salt or sea water. Ice will not adhere to **Preservoed** canvas.

PRESERVO-treated canvas cannot be excelled as covering for hatches, binnacles, telegraphs, lifeboats, working boats, sounding machines, lead-lines, sails (covers), decks, deck-loads, skylights, windlasses, donkey engines, stores, etc. Pays for itself twice over in better protection and longer life.

Go to any of the dealers listed below for information concerning Preservoed canvas. They can also supply liquid Preservo for treating the covers you are now using.

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For additional information write to us at our San Francisco address.

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311 California Street **The Hunter-Johnson Co.** **San Francisco**
DISTRIBUTORS FOR PACIFIC COAST

the Yangtsze in the south. The wealth of this section is chiefly agriculture. There are large deposits of gypsum. There is also gold, copper in minerals, tea beans, skins, cotton and varnishes in produce. The capital of this province is Wuchang, which forms with the city of Hankow and Hangyang a "Tripolis" of immense importance for central China. Hankow is known as the "Chicago of China." This city is the terminus of the Hankow-Peking railway, which is 817 miles in length and affords great advantage, running right to the waterfront of the Yangtsze river. There are several other proposed lines of railroad in the province, construction of which has not yet been started. Hankow will also be the terminus of the Hankow-Canton railway, if it is ever finished. There is situated in this province the famous Hangyang Iron & Steel Works, known the world over, and which has been previously mentioned in this report. Other large cities are Kweichow, Ichang, and Shansi, all situated, together with the above mentioned, on the Yangtsze river. There is also room for further railroad development in this province.

Hunan.—Area, 83,398. Population, 22,169,300. It is recorded that one-tenth of the population consists of aborigines. With mountains in the south, and lake and marsh lands in the north, this section produces abundant crops of rice, three crops per year being gathered. The famous Tung Ting lakes are in the north. Hunan teas have an ancient reputation. Coal is abundant in the south. The capital is Changsha, through which three railway lines run, one completed and two under construction. This province also has cotton, tea-oil, ground nuts, camphor, timber, antimony, iron, coal, copper, silver, tin, and potash. Immense room for development in mining here. Other important cities are Yochowfu, Chang-Tehfu, and Siangtan-Hsien.

Kiangsi.—Area, 69,498 square miles. Population, 26,532,000. This province is mountainous and, whilst tea, cotton, tobacco and hemp are grown, they are not largely exported owing to the lack of transportation. The great export of this province was formerly porcelain, but this has fallen off in recent years. Coal is being worked at Ping-Siang. This province in the north has the Poyang lakes. There is a railroad running from Kiukiang, on the Yangtsze river, to the capital, Nangchang. Other proposed railways running from the capital southeast and west. Tobacco, varnish, tung and tea-oil, sugar, ramie, sesamun are produced in this province. The east of this section is very densely populated and needs further railway lines.

Anhwei.—Area, 54,826 square miles. Population, 23,672,000. The great staples of this province are tea and rice, mostly grown around the city of Wuhu, which is situated on the banks of the Yangtsze river. Large exports of rice go from here to all parts of China. Anking is the capital, Wuhu is the most important city, with Feng-yanfu, the birthplace of the Mings. This province has only one railroad, which runs through it at the most northerly end. This line is a section of the Tientsin-Pukow railway, and is of no material value at the present moment to this province. If other lines were constructed which would touch at the most important cities and form a junction with this line it would be of considerable value. Anking, the capital, is only obtainable by water and old Imperial roads, and a railroad line could be constructed from the opposite bank of the Yantsze river and connect up with the Shanghai-Nanking railway, which would be of great advantage to the southern end of this province.

Kiangsu.—Area, 38,610 square miles. Population, 23,980,300, giving a density of 620 persons to the square mile. A greater density than Belgium (585), England and Wales (558). This province is traversed in every direction by numerous rivers and waterways, canals and creeks affording good means of transportation and communication, but very slow. The only railroad in operation at the present time is the Shanghai-Nanking railway. It is very rich in agricultural produce, namely, grain, cotton, tea, rice and silk, all being exported. In this province is situated the largest foreign city in China, Shanghai, which is sixteen miles from the mouth of the Yangtsze river, and situated on the Whangpo river. The largest ocean-going steamers can now proceed right to Shanghai. Sixty per cent of China's import and export passes through this city. This province is being developed industriously at Soochow, Chingkiang, Nanking and Tungchow, all these cities now having large cotton mills and factories of various kinds. Nanking, the former Imperial capital, is now the capital of this province. There are great openings for American capital and American business houses in this section.

Chekiang.—Area, 36,680 square miles. Population, 11,580,000. This province is loosely connected with the Yangtsze basin, although it formerly formed a very essential part of it. It is rich in natural products, the chief being rice, tea, cotton, silk, fish, alum, salt, tobacco and medicines. Hangchow, a former Imperial capital, is the provincial capital. This province has one completed line of railways running from Shanghai, in the province of Kiangsu, to Hangchow. This is the line which was entirely constructed by Chinese engineers. The section between Hangchow and Ningpo is not yet completed. There are other proposed lines which will run through this province, but all need capital.

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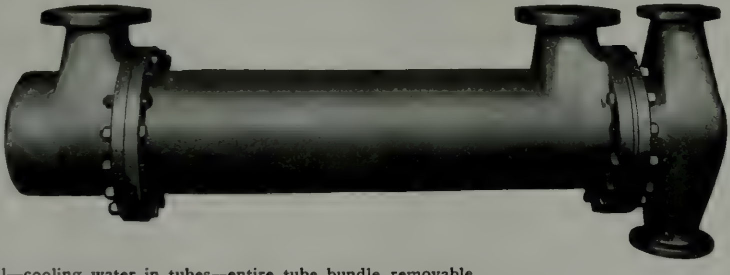

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TUBES EXPANDED into tube plates—no sweated joints.
OUTSIDE PACKED FLOATING HEAD—no expansion strains—no internal joints—impossible for water to leak into oil.
EXTREME COMPACTNESS due to high rate of heat transfer.

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BUILDING METHODS REVEALED BY REPAIR OF CUSTOM HOUSE

Workmen delving into the recesses of the foundation and roof of the ancient custom house at New Orleans have just uncovered some very interesting and surprising facts concerning the queer but thorough methods of early building operations in the South.

How a massive structure erected on planks and logs in the marshy soil of New Orleans could stand for almost three-quarters of a century without a crack or break of any character, and remain today as substantial as when it was built, is proving a marvel to modern engineering experts.

This enormous gray building occupies an entire block. On the site where it rests there stood during the early history of this city some kind of a custom house. It is worthy of note, too, that this block was then situated almost on the bank of the Mississippi river. Ever since then the river has been busily engaged in building up the "batture" with silt taken from other points, and the "batture" has grown in width from year to year until the building today stands a full 200 yards away from the river.

The first custom house was burned in the great fire of 1788, and then Governor Miro erected a better structure. Carondelet, coming on the scene later, swept away everything that was on the site, and built Fort St. Louis there, covering the entire block.

When, in their turn, the Americans took charge, they had no use for forts, so they demolished Fort St. Louis and built a brick court house in the middle of the block. A bethel stood alongside.

In 1848 both of these were removed; the site, which had been ceded to the United States, was chosen for the custom house, and the work of building began.

The Civil War came on, and it was years before the interior of the building was even approximately finished. General Beauregard had technical supervision of the building—he was then a major of engineers—and it is said that the corner stone was laid by Henry Clay. In fact, the upper floor had been completed even up to the time of the partial abandonment of the structure a few years ago, when the new postoffice was occupied by most of the Government departments at New Orleans.

The foundations prepared for this huge structure will be of interest to people of today, who are accustomed to seeing deep-driven piles made ready for any large building, and steel and reinforced concrete used to strengthen every part. The foundations of the custom house rest on a plank floor seven feet below the sidewalk, on which is a grillage of 12-inch logs, covered by a layer of concrete one foot deep. Yet the building is there. It has sunk only a foot or two—one end a little further than the other. It has not gone down into the earth as one would have expected of a massive building erected on such a foundation, in the marshy soil of old New Orleans.

A view of the roof now in course of repair offers as many attractive sights to the students of building as the under structure or the enormous stones used in the walls. Here the carpenter has torn off the copper covering and revealed a great layer of Southern yellow pine sheathing in almost perfect condition. This sheathing was put down under the original roof of the building, and has performed continuous service since. Here and there a defect in the roofing has permitted water to seep through and cause a small spot partially rotted. With this exception the sheathing is as good today as it was when cut from the Southern pine forests of Louisiana before the Civil War.

STANDARD TAKES COAST AGENCY FOR MONARCH CARBURETOR

The Standard Gas Engine Co., of Oakland, Cal., manufacturers of the well known "Frisco Standard" heavy-duty gas engines, and coast distributors for the Southwark-Harris valveless oil engine, have been appointed the sole Pacific Coast agents for the well known Monarch carburetor, manufactured by the Monarch Valve Co. of Brooklyn, New York.

The Standard people have been using the Monarch carburetor on the Frisco Standard engines for more than a year, and have thus had a chance to put them to the utmost test, and have found that they cannot be excelled for slow-speed, heavy-duty engines, as they give a minimum amount of fuel consumption and operate with an equal degree of efficiency on gasoline, benzine, or No. 1 engine distillate. In addition to this, they are so simple and durable in construction that they have proven the ideal carburetors for both men in small fishing boats and for the rough work of larger motor vessels.

The Monarch manufacturers will be assured of splendid distribution of their product through the Standard Gas Engine Co., which has one of the finest lists of agencies along the coast and through the Orient of any manufacturers in America. The branches at such places as Astoria and San Pedro, and the agencies at many other Coast points, will act as distributing centers for these carburetors, and a very large stock will be carried in the Oakland plant.

Dealers as well as individual purchasers who are interested in the subject of carburetors will do well to get in touch with the Standard Gas Engine Co., either through the main office or the company's nearest agents.

MARINE MISHAPS

"SONOMA," Str.—From Sydney, July 4th, for San Francisco, struck on a reef off Turtle Island, near Pago Pago, July 8th, but was backed off and proceeded. Cost of repairs about $60,000.

"DEL NORTE," Str.—From Crescent City, July 28th, with a cargo of lumber for San Francisco, went ashore, July 29th, near Pt. Arena. Later floated off but turned bottom up. She was picked up, August 3rd, and towed to San Francisco, where she has been righted. No insurance.

"LAHAINA," Bktn.—From Levuka, May 24th, for San Francisco, sprung aleak, June 1st, and was obliged to burn part of the cargo of copra and hardwood to keep the pumps going. She arrived at San Francisco July 31st.

"R. P. RITHET," MS.—From Mahukona with a cargo of sugar for San Francisco, caught fire in the engine-room and was abandoned at sea on July 21st. Cargo insured locally.

"FUKUI MARU," Jap. Str.—From Kobe for Puget Sound, caught fire at Muroran on Aug. 8th and considerable cargo was damaged before the fire was extinguished.

The "Desna" of the Royal Mail Steam Packet fleet. This fine 13,000 ton liner was recently sunk by German pirates.

"KOTO HIRA MARU," Jap. Str.—From Kobe, July 13th, for San Francisco. Word has been received from the first officer, dated at Dutch Harbor, that this steamer went ashore on Amtichitka Island, one of the Aleutian group, on July 27th, and that ship and cargo would be a total loss.

"UNKAI MARU," Jap. Str.—From San Francisco, Aug. 14th, for Yokohama, put back to port on account of cargo in the forward hold shifting when crossing the bar.

THE CONCRETE SHIP

The new concrete ship is being developed primarily from the efforts of Mr. Leslie Comyn, a well known shipping man of the firm of Comyn-Mackall & Company, and the engineering firm of McDonald & Kahn.

The concrete ship is to be of the tramp type, with the boilers and machinery aft; 320 feet long, 44 feet beam, and 24 feet draft loaded, and of 5000 tons dw. capacity. The hull alone will weigh 400 tons more than an ordinary steel hull. Lloyd's specifications will be followed.

The concrete used will be different from the ordinary concrete in that an excess of cement will prevail. The engineers have searched all over the State for the best quality of cement, and have settled on the best material to be used for the ship. In addition to cement, they will use a chemical which will materially increase the coefficient of elasticity of the concrete. This compound is being made by chemical engineers of San Francisco.

The ship will be single bottom and will have 1700 h.p. engines and will travel at about ten knots.

After completing the building-ways and yards at Redwood City, Mr. McDonald said that they would be able to turn out a hull every thirty days.

It was first decided to use the hull for a barge and make several trips across the ocean to Honolulu, but now everything is going ahead in such a satisfactory shape that they are talking about installing the machinery in the hull right after launching. In this final matter of machinery, however, it has not been definitely settled whether the hull will be towed across to Honolulu or whether the machinery will be installed immediately after launching.

The docks now in use by the Pacific Steamship Company in San Francisco, Los Angeles and San Diego are among the most modern in the world. A few months ago the company began using the municipal dock at San Diego, and a few weeks ago it took over the last unit of the Los Angeles municipal dock at Wilmington. Extensive improvements in office arrangement are under way on the company's docks in San Francisco.

HOW TO SOLVE THE CATALOG PROBLEM

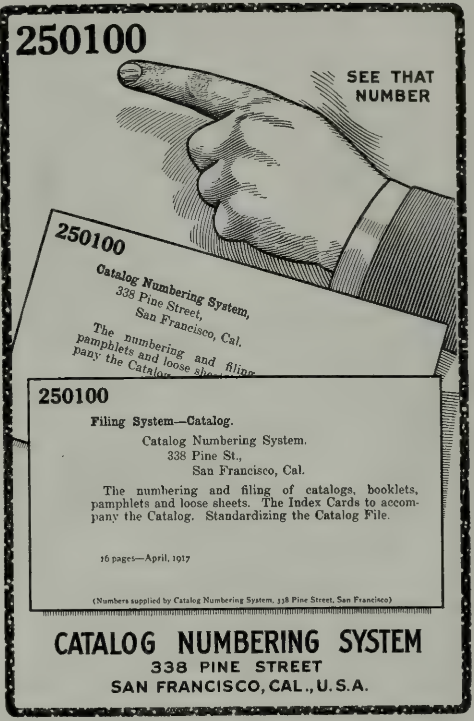
Perhaps no other office adjunct is more difficult to keep tab on than the catalog, and yet a collection of good catalogs forms one of the finest reference libraries an office can possess. Catalogs come in every shape and size, and this is the feature which militates against those in charge of an office filing system from getting the service out of catalogs that should be gotten out of them.

One of the latest and certainly most promising methods of overcoming the inherent desire of catalogs to find their way into the wastepaper basket or become hopelessly involved in some cumbersome filing cabinet, is that devised by the Catalog Numbering System of 338 Pine Street, San Francisco, which proposes to settle the matter by having the catalogs properly card-indexed at their source and cards furnished along with the publication, so that when a catalog arrives at an office it will be self filing, thus insuring the recipient that his catalogs will be easily available at all times and insuring the sender that his catalog will neither be lost, thrown away or misplaced.

The Catalog Numbering System has just distributed its catalog number 250100, illustrating and describing a new method of numbering and indexing trade catalogs and loose-leafs that deserves the attention of all parties interested in this problem. Two index cards bearing the same serial number are sent with the catalog; examples of numbering catalogs are given, and also several index-cards are shown. Advantages to be gained by the introduction of this system are set forth as well as the disadvantages of the present method of catalog distribution. There are "instructions for the printer" and "how to order numbers."

The Catalog Numbering System is in reality merely a central registering office, where the selecting and assigning of numbers will be done upon request for a small fixed price per number. The number will be chosen according to the size, shape, thickness and binding of the catalog without reference to its text or subject matter. Numbers will not exceed six figures, used in conjunction with the alphabet. The catalogs when filed numerically will be automatically grouped according to their general external dimensions in a uniform and orderly arrangement.

This system places the responsibility of numbering and indexing directly upon the manufacturer or merchant issuing the catalog; it permits him to retain control of his catalog until it is indexed and placed in the customers' files; it assures him that his catalog will be filed if it is not destroyed, and it will not be destroyed because it is self-filing, and also that it will be indexed according to his own dictation. Those receiving catalogs are directly benefited because they can eliminate all the trouble incident to filing.



250100

Filing System—Catalog.

Catalog Numbering System,
338 Pine St.,
San Francisco, Cal.

The numbering and filing of catalogs, booklets, pamphlets and loose sheets. The Index Cards to accompany the Catalog. Standardizing the Catalog File.

16 pages—April, 1917

(Numbers supplied by Catalog Numbering System, 338 Pine Street, San Francisco)

CATALOG NUMBERING SYSTEM
338 PINE STREET
SAN FRANCISCO, CAL., U. S. A.

BURNS, PHILP AND CO. LTD.

This concern, whose headquarters are at Sydney, Australia, report a very satisfactory business for the year ending March 31st. The gross profits, including balance brought forward, is roughly $2,250,000, and this sum less salaries, depreciation, taxation, losses, etc., leaves a balance of about $750,000 to be dealt with. From this amount a bonus of 12 cents per share is allowed, $250,000 is placed in the reserve fund, $50,000 is set aside for a ten per cent bonus on salaries, $35,000 is credited to the insurance fund, and about $55,000 is carried over for the new year's balance. Owing to the war, the company has been unable to arrange for the building of any new steamers, but several small copra schooners are under way.

An interesting development in the business of this firm is the opening of a regular office in the Merchants Exchange Building, San Francisco, under the charge of Mr. Joseph Mitchell, who came to this country to order and look after the building of new trading schooners. This development has been brought about by the heavy trade and high freight rates on copra. It is expected that a full dozen of vessels will soon be plying between San Francisco and the copra ports.

SHIP-BUILDING and ROPE-BUILDING

Every detail of ship-building must be carefully watched. A weak plank or rib, a bad plate or bolt means weakening of the whole ship's structure.

COLUMBIAN Rope is built just as carefully as any ship. Every fibre, thread and strand must do its share of the work. Every step in the manufacture of COLUMBIAN is carefully watched by expert inspectors.

You can trust COLUMBIAN lines—
all the time.

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AUBURN "The Cordage City" NEW YORK
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FOR MARINE SERVICE

WINTON ENGINE WORKS
2116 W. 106TH STREET
CLEVELAND, OHIO, U.S.A.

With the Producers and Dealers

NEW YORK TERMINAL IMPROVEMENT

(By Edward F. Cullen, President of the Cullen Barge Corporation.)

Greater New York Harbor may now look for much relief from freight congestion. Old-fashioned methods of handling freight for overseas will now be relegated to the rear and new and modern facilities will prevail. Governor Whitman of New York and Governor Edge of New Jersey have appointed the members to serve on the New York-New Jersey Harbor Development Commission.

There is a great need for more barges and lighters for the transference and storage of freight in New York Harbor. Our organization is making every effort to expand to meet the new conditions, and is building barges of a new and larger type.

My father often related how in the early sixties when railroad transportation had just begun to see the need of a more modern system of rail equipment to carry the increasing freight offered by the public, and about 45 years after the opening of the Erie Canal, he saw the future of modern equipment for our inland waterways, including the historic Hudson, over which much of the freight from up-state, and the Great Lakes district was shipped to New York and the Atlantic Seaboard, and today the barges which he built, each to fit the particular requirements in shipping freight have received the praise of everyone.

The Cullen Barge Corporation has endeavored to equip each new barge that it builds to fit a greater variety of work and which can be operated with the least amount of expense consistent with good and accurate service. The corporation has recently received five new barges from the shipyard which are models of perfection in design, freight carrying capacity and habitable quarters for the labor operating them.

This type of barge is now known wherever barges are employed and demands and receives the highest charter rate for barges of modern type. As a temporary storage place the average freight barge is hard to compete with in storing goods as the water in which it rests costs only a nominal fee, which is exacted by the State for wharfage.

Congestion on railroads and transportation of freight from freight terminals to steamers loading in our harbor and bay will decrease from now on. Efforts to alleviate the freight car shortage and congestion were begun on July 7, 1917, with the formation of the Intesrtate Commerce Commission's division to regulate freight car service in delivering freight to our seaports until we can increase our port facilities.

This will make work for hundreds of barges and harbor craft. There was appointed at the head of this division, a traffic expert who was formerly connected with one of the most prominently successful terminal companies in this country. He said recently that the true solution for the present needs of the port of New York were more well appointed warehouses and more modern barges for use in the harbor, sound and river.

Our local and United States officials are bending every energy to prepare our piers, docks and marginal railways for the receipt and dispatch of the great increasing quantity of freight arriving in the port of New York.

Many barge canal terminals are being constructed here and will be equipped with the latest devices known for the quick and inexpensive handling of freight of all kinds. These terminals will be harnessed with fast-acting cranes, capable of moving a load of many tons, link belt machinery that will carry a constant chain of small freight, or at the new coal piers, deliver coal to the barges for final transfer to ships in the shortest possible time that human ingenuity and skill can contrive.

To further facilitate the moving of the harbor's enormous quantities of freight and to more speedily unload freight from freight cars, promoters are busy with a plan to connect up New York's entire water front into one gigantic municipal terminal railway. Special freight yards are being designed for the receipt of each class of freight, coal will, on its arrival here, go immediately to the coal yard, steel to the steel yard, L. C. L. freight to the L. C. L. freight yard, lumber to the lumber yard, etc.

These terminal yards are to be equipped with the latest known inventions to speedily load on barges each class of freight with a minimum amount of man power. The constant improvement of the facilities of this great terminus brings further need for barges as they are necessary to this entire wonderful system.

When a steamer lands at her home pier to take cargo, it is only practical for her to receive part of her freight from the pier. A large quantity of many different kinds of freight is generally used to properly nest or arrange the cargo in loading for a safe voyage at sea. Besides the freight taken from the pier, many barges of freight are discharged into the steamer before it sails. These barges are placed around the sides of the steamer while she is in her berth and quantities of their different cargo are taken aboard the ship as needed by the stevedores.

In connection with this company's business, is the Customers' Service Bureau, which is handled by its most experienced employee. Here is where plans are worked out for the customer and all information on water transportation is supplied to the shipper.

OPEN NEW OFFICES

On July 15 the Federal Composition & Paint Company, Ltd., and the Briggs Bituminous Composition Company opened joint branch offices at 120 Walnut street, Philadelphia, with Mr. Milton Gray as manager. This move was necessitated by the remarkable increase in the demand for marine paints and compositions in the Delaware river district.

CATALOG N, 1917. THE McNAB CO. This catalog is descriptive of the McNab Direction and Revolution Indicators, and is a handsome and readable exposition of these well known aids to navigation.

HERZOG ELECTRIC AND ENGINEERING CO.

150 Steuart Street
San Francisco

ELECTRIC CARGO HOISTS
ELECTRIC STEERING GEARS FOR MOTORSHIPS
MARINE ELECTRIC INSTALLATIONS, SWITCHBOARDS, SEARCHLIGHTS AND COMPLETE EQUIPMENT FOR MOTOR AND STEAMSHIPS

Representing DE LAVAL STEAM TURBINE CO.,
PROPELLING TURBINES, BOILER
FEED, FIRE, BALLAST PUMPS, AND TURBO-GENERATORS

Pan Straight Neck

"PERFECTION"

RIVETS

SHIP RIVETS
BOILER RIVETS
STRUCTURAL RIVETS

P
ON EVERY HEAD

DIAMETERS ½" TO 1½"
ALL LENGTHS
Capacity 150 Tons per Day

HIGHEST GRADE—MADE FROM CARNEGIE STEEL
Write for Prices

Pan Swell Neck

ANTHONY CARLIN RIVET WORKS CLEVELAND, OHIO

The superiority of
LUNKENHEIMER
Cast Steel Valves

is an established fact; proved by the highly satisfactory results which they give under extreme service conditions. In design, they incorporate every detail which engineering practice has shown to be best.

The material—Lunkenheimer Cast Steel, is manufactured by the most improved method and complies with the specifications for steel castings as prescribed by the American Society for Testing Materials. The tensile strength averages about 70,000 pounds per square inch.

The castings are annealed before leaving the foundry so as to insure a perfectly homogeneous structure and to relieve all internal casting strains.

The trimmings are made of Monel, Nickel, or Bronze, according to the duty the part performs and the pressure and temperature of the steam carried.

The workmanship is Lunkenheimer "Quality".

Install LUNKENHEIMER CAST STEEL VALVES for continuous satisfactory service.

WRITE FOR DESCRIPTIVE LITERATURE

Globe, Angle, Gate,
Balanced Throttle,
Non-Return, Pop Safety,
Blow-off Valves, etc.,
for W. S. P. up to 350
lbs. and 800° F. temp.

Photo-micrograph of LUNKENHEIMER Cast Steel.

Photo-micrograph of Ordinary Cast Steel.

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"QUALITY"
Largest Manufacturers of
High Grade Engineering Specialties
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52nd and Santa Fe Ave. LOS ANGELES, CAL.

NIPPON YUSEN KAISHA'S HALF YEAR

The balance sheet and profit and loss account of the Nippon Yusen Kaisha for the half year ending March 31, 1917, should prove eminently satisfactory to the stockholders in that great steamship company.

Balance Sheet, 31st March, 1917

Assets

Unpaid Capital	Yen	16,500,000.000
Payment on account of New Ships	"	1,607,100.000
Reduced Book Value of Fleet	"	36,779,288.890
Reduced Book Value of Launches, Barges, etc.	"	457,515.270
Buildings and Land	"	7,439,338.880
Ships' Stores in Stock	"	558,099.690
Public Loans and other Securities	"	33,486,065.790
Cash at Bankers and in hand	"	21,785,860.540
Sundry Debtors	"	4,916,401.540
	Yen	123,529,670.600

Liabilities

Share Capital	Yen	44,000,000.000
Insurance Fund	"	13,363,002.700
Ships' Structural Repair Fund	"	4,496,585.650
Reserve Fund	"	5,714,030.720
Dividend Equalization Fund	"	2,300,000.000
Fund for Extension of Services and Improvement of the Fleet	"	6,000,000.000
Reserve for Construction and Repairs of Buildings	"	3,000,000.000
Special Reserve	"	500,000.000
Pension Fund for Employes	"	3,588,608.070
Sundry Creditors	"	2,089,153.000
Amount brought forward from last account	"	18,961,156.810
Net Profit for the Half-Year	"	19,517,133.650
	Yen	123,529,670.600

Profit and Loss Account

To Depreciation of Fleet and Property	Yen	1,443,457.350
To Insurance Fund	"	844,301.430
To Ships' Structural Repair Fund	"	350,352.860
To Reserve Fund	"	975,856.680
To Directors' and Auditors' fees	"	200,000.000
To Dividend (8% p. a.)	"	1,100,000.000
To Special Dividend (2% p. a.)	"	275,000.000
To Extra Special Dividend (20% p. a.)	"	2,750,000.000
To War Bonus for Employes	"	400,000.000
To Balance to be apportioned as below	"	32,777,433.780
	Yen	41,116,402.100
By Balance brought forward 30th September, 1916	Yen	18,961,156.810
By Surplus of earnings for the Half-Year ended 31st March, 1917	"	22,155,245.290
	Yen	41,116,402.100
To Special Reserve for War Risk and Depreciation of Vessels to be Built and Purchased	Yen	13,500,000.000
To Special Depreciation of the Book Value of the Fleet	"	3,000,000.000
To Special Reserve	"	5,500,000.000
To fund for Training, Protection and Encouragement of Seamen	"	500,000.000
To Dividend Equalization Fund	"	3,270,000.000
To Extra Special Dividend (40% p. a.)	"	5,500,000.000
To Directors' and Auditors' Extra Allowance	"	150,000.000
To Extra Bonus for Employes	"	825,000.000
To Final Balance to be carried forward to next account	"	532,433.780
	Yen	32,777,433.780
By Balance brought down	Yen	32,777,433.780

At the close of their last half business-year, the fleet of the Nippon Yusen Kaisha was composed of 100 vessels of a total gross tonnage of 459,260 in actual service, two steamers and several barges building and one steamer chartered from the Japanese Government.

MEN WHO HAVE SERVED IN NAVY WANTED

Thousands of men in civil life who hold honorable discharges from our Navy and desire to offer themselves again for re-enlistment with prospects of early and active service, will be much interested in the special opportunities the Government is now offering them. Good ratings await ex-Navy men aboard the large fleet of patrol vessels which the Government's agents, the International Mercantile Marine Company, have purchased and are now outfitting. Commander F. N. Freeman, U.S.N., who heads the Special Board of Patrol Vessels, speaking with officials of the International Mercantile Marine Company, said that ex-Navy men are the ideal applicants for such service, and in every way best fitted for the valuable work these ships are bound to perform in the contest for the freedom of the seas. Navy officials hope that large numbers will offer themselves in person or by letter to the International Mercantile Marine Company or to Commander Freeman, both located at 9 Broadway, New York.

LARGE CONTRACT FOR SOOT CLEANERS

The Vulcan Soot Cleaner Co., through the De Ved-Kissick Co., their New York representatives, has recently closed a contract for soot cleaners for ninety-eight boilers for a group of electric light, power, and railway companies, controlled by the H. L. Doherty Co. The boilers are of various types, including a large number of Stirling make. The general recognition among engineers of the efficiency of mechanical soot cleaners as compared to hand blowing is indicated by this and similar recent orders for the entire equipment of large plants and groups of plants. The continual rising of price of coal is also accountable for the placing of these orders.

Milburn Oxy-Acetylene Apparatus

Highest quality construction for long service and economical operation. Plants for every requirement from small portable repair outfits to large generating and compressing installations.

Send for Catalog 37 for full particulars

The Alexander Milburn Co., Baltimore, Md.

Hoffite Plastic Asbestos Flooring

THE IDEAL FLOORING FOR DECKS OF SHIPS

ONE PIECE—WITH COVED BASE—NO SEAMS—STANDS VIBRATION

Some recent installations include the steamers
"Horace X. Baxter" "Ernest H. Meyer" "Ryder Hanify" "Phyllis" "S. T. Allard" "Robert Sudden" "Wapama"
U. S. Department of Commerce—Lighthouse Tender "Cedar"
U. S. Shipping Board—German Steamer "O. J. D. Ahlers"

U. S. Naval Hospital—Mare Island

Hoffite Flooring is laid in any color, 1½ inches thick, over old or new flooring, whether wood or steel, and presents a continuous sanitary surface which is durable and up-to-date.

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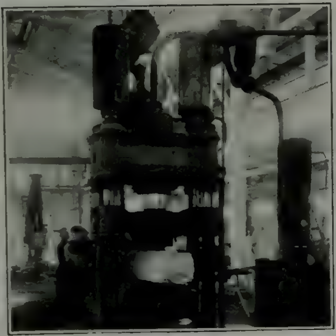

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Stern Frames
Tail, Line and Thrust Shafting
Rudder Stocks and Posts
Connecting Rods

Pacific Construction & Engineering Co.

SEATTLE, WASHINGTON

GALVANIZING

BY

HOT DIP PROCESS

SPECIAL ATTENTION GIVEN TO
SHIP REQUIREMENTS

Pacific Metal & Galvanizing Co.

2, 4, 6 and 8 Hanford St.,
SEATTLE, WASH.

Marine Supply Co.
PIER 1
Seattle, Wash.

Mascot Ship Stoves
Union Gas Engines
Koban Motors

Durable Sheet Packing
Palmetto Packing
Firma Gauge Glasses
Everlasting Blow Off Valves

Woolsey's Best Copper Paint
New Bedford Cordage
Bibb Manfg. Co.
Seine Twines & Cotton Rope
R. J. Ederer & Co.'s Cotton and Linen Netting

HANDBOOK OF SHIP CALCULATIONS, CONSTRUCTION AND OPERATION

By Charles H. Hughes, Naval Architect and Engineer, 740 pp., 112 diagrams and illustrations. D. Appleton & Company, New York and London.

This new handbook covering a subject that has been so often handled before possesses many new features and many points of merit. The work is thoroughly practical and theoretical calculations have found no place on its pages. Perhaps the most striking feature of the Hughes handbook is the wide range of subject matter that is covered. There are sections on weights, measures and formulae; strength of materials; shipbuilding materials; ship calculations; hull construction; machinery; electricity; heating, ventilation, refrigeration, drainage, plumbing and fire extinguishing systems; ship equipment, and finally an extensive section covering ship operation. In this last section of the handbook will be found chapters on loading and stowing of cargoes, machinery operating and maintenance, ship chartering, marine insurance and tables of export and shipping terms. The Hughes handbook will be found of value among wider circles of users than many other shipbuilding pocket books owing to the wide field covered. The mechanical make up of the volume, its complete cross indexing and the arrangement of the subject matter leave nothing to be desired.

THOMSON DIRECT-CURRENT ASTATIC WATT-HOUR METERS, TYPES CS AND CS-3

Bulletin No. 46209, entitled "Thomson Direct-Current Astatic Watt-hour Meters, Types CS and CS-3," has just been received from the General Electric Company. These meters, as described in the bulletin, have similar electrical characteristics, but differ materially in structural details, the Type CS being intended for switchboard work and the Type CS-3 for installations where front connections are suitable. Both types are constructed on the astatic principle to minimize the effect of external magnetic fields which are commonly encountered when dealing with large direct-current circuits.

Full information regarding construction and dimensions, as well as diagrams showing connections of these meters, will be found in this 16-page bulletin.

HOLLAND-AMERICAN CHAMBER OF COMMERCE YEAR BOOK. The Holland-American Chamber of Commerce Year Book, containing the annual report of the President and Secretary of that organization, is a handsome bit of printer's art work as well as a valuable collection of data touching upon the trade of the United States and particularly the trade of the Pacific Coast with the Netherlands and her colonies. Copies of this handsome and valuable publication may be obtained from the offices of the Chamber at the Russ Building, San Francisco.

LONGMANS' BOOKS ON NAVAL ARCHITECTURE

TEXT-BOOK OF THEORETICAL NAVAL ARCHITECTURE

By EDWARD L. ATTWOOD, M. Inst. N. A., Member of Royal Corps of Naval Constructors, formerly Lecturer of Naval Architecture at the Royal Naval College, Greenwich. New Edition, Revised and Enlarged. With 159 Diagrams and 5 Folding Tables. Crown 8vo. $3.00 net.

Clearness and conciseness of expression characterize this book. A notable feature is the direct practical application of the methods taught; also, there are a large number of problems like those included in examinations, which makes the book particularly valuable to those students who must rely largely on themselves. Two new chapters have been added to this edition, one on launching calculations, and one on the turning of ships.

WARSHIPS: A Text-Book on the Construction, Protection, Stability, Turning, etc., of War Vessels

By the same author. With numerous Diagrams. Sixth Edition. Medium 8vo. $4.00 net.

Though intended primarily to provide naval officers with authoritative data on the subject, the work will also prove a useful introduction to naval architecture for apprentices and students at dockyards and elsewhere. The author discusses not only the various parts and characteristics of ships, but also various types of war vessels. There are likewise chapters on rolling, resistance and propulsion of war vessels, their design, etc.

The various changes of practice made in recent years will be found embodied in this edition.

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FORE RIVER LOG

The latest issue of this interesting Fore River Shipbuilding Corporation publication contains among other features, an account of the manner in which the workmen in the Bethlehem Steel Corporation and its subsidiary companies took up the matter of subscribing to the liberty bonds. The splendid results achieved are tabulated in the following table:

	Men on Payrolls	Percent Force Subscribing	Dollars Subscribed
Bethlehem	26,314	97.8	$2,066,950
Steelton	9,852	91.5	707,950
Sparrow's Point	8,184	96.	508,950
Lebanon	6,244	89.4	382,500
Titusville	256	54.7	13,850
Newcastle	883	100.	64,150
Harlan & Hollingsworth	1,876	60.3	95,900
Fore River	5,500	93.	345,950
Union Iron Works	9,201	100.	645,100
S. L. Moore	750	82.2	43,800
Detrick & Harvey	292	100.	20,000
Penn. Mary. Coal Co.	520	57.5	22,550
General Offices	15	100.	860,000

Total figures all plants as follows: Men on payroll, 68,874; number men subscribed all plants, 65,861, or 94.3%. Total dollars subscribed $5,777,650, average dollars subscribed per man $87.50.

WHITE BROTHFRS 1917 STOCK LIST

The latest stock list of White Brothers, the leading hardwood dealers on the Pacific Coast, is an interesting little book as besides listing the largest and most complete stock of hardwoods on the Pacific Coast it furnishes accurate tables giving the weight of different woods, the botanical name and habitat of each of the well known species, Scribner's table for the measurement of hardwood logs, Spaulding's table for the measurement of Pacific Coast grown logs and a valuable table for the measuring of hardwood lumber. Hardwood is measured with a board rule and every quarter of an inch is figured in. This makes checking up and figuring these woods rather tedious and the table will be found of great value by purchasers.

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HEADLIGHTS AND TURBO-GENERATORS FOR STEAM LOCOMOTIVES

The General Electric Company has just prepared for distribution Bulletin No. 42014, entitled "Headlights and Turbo-Generators for Steam Locomotives." To meet the rigid requirements of locomotive headlight service, the General Electric Company has designed a turbo-generator set distinctly novel in its construction and representing the most advanced development in this class of apparatus along practical lines. Three years of exhaustive service tests and a knowledge accumulated from a vast amount of experience in turbine manufacture have resulted in the building of these turbines with the smallest number of parts consistent with the requirements of good design, durability, efficiency and close regulation.

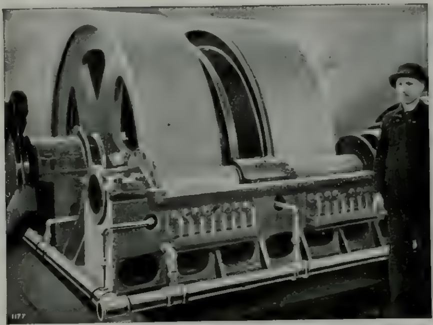
The headlight supplied with the turbo-generator consists of an 18-inch silverplated copper reflector, equipped with a simple focusing device mounted on a suitable table and enclosed in a steel casing of standard design. The reflector has a 2¼-inch focal length, which is sufficiently long for accurate focusing of the largeset headlight lamps.

In addition to the turbo-generator and headlight, the necessary accessories are furnished in accordance with the requirements of existing headlight practice.

Diagrams showing the assembly of the turbo-generator set, as well as all necessary data, will be found in this 12-page bulletin.

LLOYD'S REGISTER OF AMERICAN YACHTS. Lloyd's Register of Shipping, 17 Battery Place, New York. 500 pages, 48 colored plates. $8.50.

Coming just at the preliminary stage of the yachting season, when owners are making their final plans for the fitting out and use of their yachts, the formal declaration of the existence of a state of war between the United States and Germany has forced upon clubs and individuals alike the immediate decision of a very important question of policy. The prompt action of the



An Efficient Reliable Gear

One of the large steamship companies is building a number of 17½-knot passenger vessels, each of which is to be equipped with twin screws, driven by geared turbines.

The turbines are of the compound type, consisting of a high-pressure section mounted upon one shaft and a low-pressure section mounted upon the other. The turbine shafts are coupled to pinions located on each side and meshing with a single gear which is connected to the propeller shaft. One of these gears is shown herewith. The turbines run at 1500 r.p.m. and the propellers at 120, each propeller requiring about 4500 h.p.

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Government in demanding the services of a large number of yachts has in many cases left no choice for either; many owners have accepted the fact that for them yachting is out of the question for this year at least, and many of the larger clubs, led by the New York Yacht Club, have definitely abandoned all races and cruises. While the sentiment of the yachting fraternity is apparently rather evenly divided between the question of a total cessation of all sport during the continuance of the war, or of keeping alive the interest in yachting so far as may be done without obvious detriment to public interests, it is certain that the early promises of a lively season of building, racing and cruising have vanished, and that the activities of 1917 will be local rather than general, and limited to the small craft.

While a clubhouse may be closed or a yacht laid up for a season without permanent detriment, the case is very different with a yacht register; as long as the yacht fleet exists, a record of it is necessary, and in recognition of this need the publishers of Lloyd's Register of American Yachts have decided to issue it as usual, in spite of the lessened demand and the various adverse conditions resulting from the war.

The removal of yachts from the Register has followed the same course as last year, but with marked acceleration. There was evident then a lessening demand on the part of owners for the old type of large steam yacht and also for the larger sailing yachts and auxiliaries, many being sold for commercial service or even for breaking up. The same condition prevails this year, the demand for such yachts is decreasing on the part of yachtsmen, large power yachts of all types are needed as war auxiliaries, and the scarcity of commercial tonnage has led to the use of many yachts as mere cargo carriers. Another important factor is the very high prices of all metals, which has led to the breaking up for the lead, copper, and bronze of many of the smaller yachts.

Through the early part of the building season there was every indication that the exceptional record of 1916 would at least be equaled; there was a strong demand for power craft of large and medium size, and mainly of the naval type. In addition, the smaller cruisers were quite as popular as ever. In the uncertainty consequent on the announcement of war, building orders were countermanded, many yachts under construction were turned over to the Government, and the entire energies of both designers and builders were diverted into new channels of national defense. The difficulty of securing full information as to new yachts in time for early publication has been much greater this year than ever before, and, added to this, is the fact that during the time that the actual printing of the Register was in progress a very large number of the yachts have been diverted to Government service. Owing to military reasons, much of the information as to the conversion of yachts to naval uses is withheld by the authorities; even now many of the transactions are incomplete, and it is a matter of the utmost difficulty to ascertain just how many yachts have been taken and on what terms in each case, loaned, chartered, given or sold. Such information as has come to hand since the actual printing of the book will be found in the Addenda, which is sent out with the bound volume, and additional information will be given later in a supplement. As an indication of the changes which take place from year to year in the Register, it may be mentioned that out of a total of 3351 yacht owners entered in the present edition, 517 are new this year.

The recent departure of such yachts as the "Corsair" and others of her type for European waters is but one instance of the part which American yachts may be called on to take in the war, and if there is less demand than usual for yachting information in connection with racing and cruising, the Register will fulfill this year a more important service as the only record of the many smaller naval auxiliaries in which so many have a direct personal interest in that they are manned largely by volunteers from the yacht fleet.

The Register is unchanged in size and form, 520 pages of letter-press with 48 colored plates; the number of yachts entered in the book proper is 3590; clubs, 546; associations, 38; club and association burgees, 600; private signals of yachtsmen, 1872. It is published by Lloyd's Register of American Yachts, 17 Battery Place, New York City.

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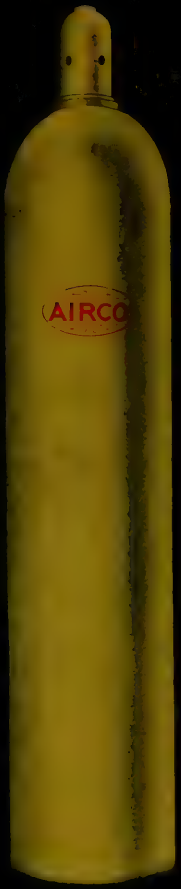
PACIFIC MARINE REVIEW

OCTOBER 1917



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PACIFIC MARINE REVIEW
The National Magazine of Shipping

VOL XIV, No. 10 SAN FRANCISCO OCTOBER, 1917

Our Future on the Sea

PERHAPS no question is more subject to serious speculation than that of America's future on the sea after the war. This question is brought forcibly home to us through the acquisition of a tremendous fleet which will be either directly or indirectly under government control. Another twelve months should see the fleet of the Shipping Board aggregate 7,000,000 tons, at a very conservative estimate, and this amount of ocean-going tonnage is bound to prove a great factor in the world's commerce.

The building program of the Shipping Board has assumed such proporions that, should the cessation of hostilities not bring to an end the need for drastic government action, within twenty-four months of the present time the Emergency Fleet Corporation will have under its direction a fleet whose tonnage will outstrip that of any entire country with the possible single exception of Great Britain. In this statement, of course, we refer to Great Britain's fleet as it stands today and not to the augmented fleet which will be hers at the end of two years; for Great Britain has eased up the naval demands on her shipyards to such an extent that they are once more headed toward their old figures of normal production and may soon pass, like our own yards, into the abnormal class.

But despite the activities of other shipbuilding nations, the fleet flying the Stars and Stripes will be no mean factor in the ocean-going tonnage of the world, and it will probably be some time after the close of hostilities before any very keen competition from foreign bottoms is felt along the lines of communication and trade set up by these fully or semi-controlled government ships.

If the great fleet now being built up were suddenly thrown over into private hands after the war and owners tried to operate them under the old American laws, the result would be a matter of speculation of a very dubious sort. Would the American fleet gradually dwindle until it had practically disappeared from the deep seas as it did once before in our history? We are of the opinion that this would be the case. There is another aspect to the question, however, that presents itself in a far rosier light. This great fleet of freighters will be either directly controlled through government ownership or indirectly controlled under a strictly prescribed group of charters. The government would learn at first hand just what the advantages and disadvantages of flying the Stars and Stripes were. The advantages could be turned to good account and the disadvantages minimized if not done away with altogether. Where either the law or economic circumstances pinched and retarded a healthy growth, some outlet could be found. In short, the Government could learn just what has prevented American capital from creating a great merchant marine in the foreign trade long since, and when the Government has remedied the defects the mighty fleet that had been built up could be turned back gradually into the full control of private interests with the full knowledge that our share in the foreign carrying trade would continue to increase and not languish. This, then, is the great hope of the American foreign-trade merchant marine, that the teachings of the past two years and the lessons that are to be learned by our government in the next few years will not be forgotten.

The Government Schools for Ship Officers

By Farnham P. Griffiths

THE United States Shipping Board is building and commandeering vessels for the new American Merchant Marine. The Recruiting Service of the Board, under the directorship of Mr. Henry Howard of Boston has undertaken to provide this fleet with officers. It is estimated that 10,000 men are needed—5000 in the deck and the same number in the engine departments. At present there are not enough licensed officers and engineers in the country to meet the call—indeed there is, if anything, a shortage of men for the ships America now has. New men must be trained.

To this end the Recruiting Service of the Shipping Board has organized and is now conducting free Government Navigation and Engineering Schools on the Atlantic, Gulf and Pacific seaboards and on the Great Lakes. The headquarters of the Recruiting Service are in Boston. For administrative purposes the schools have been grouped geographically into so-called "sections"—there are six in all—each under the direction of a "section chief" reporting and responsible for the proper conduct of the school in his territory to Director Howard. The instructors in the navigation schools are astronomers and navigators appointed by and responsible to Head Instructor Dean Alfred E. Burton of the Massachusetts Institute of Technology; while the engineering schools are conducted in co-operation with educational institutions having the necessary apparatus and equipment, instruction being under the general supervision of Professor Miller, also of the Massachusetts Institute of Technology.

California is Section 5 and has three navigation schools located respectively in San Francisco, San Pedro and San Diego. The Recruiting Service is conducting only one marine engineering school on the Pacific Coast. It is located at the University of Washington, Seattle. The three California schools all began instruction on August 20, 1917. Each reports an enrollment of some thirty students found in experience to be about the number which can be advantageously taught by one instructor. Additional instructors will be provided as the steadily increasing enrollment requires.

Sea experience (with some minor exceptions in the case of the engineering schools) is requisite for admission to the schools. The sea experience required is that prescribed for licenses by the United States Steamboat-Inspection Service. Before acceptance by the schools, therefore, candidates must have their applications approved by the local inspectors of steamboats. They must also pass a physical test for acuity of vision, color sense, and hearing. The wisdom of requiring candidates to pass these tests as to experience and health before enrollment in the schools is obvious—to insure that the Recruiting Service shall not be training men who will afterward fail to secure licenses even though capable, on finishing the course in the schools, of passing the examinations prescribed by the Steamboat-Inspection Service. In coming up for licenses, therefore, graduates of the schools are not (pursuant to an understanding between the Shipping Board and the Inspection Service) required to be re-examined for experience and health. Those tests passed before admission to the schools are over with once and for all.

The course lasts normally six weeks. Morning and evening classes are conducted and students may select either according to their convenience. The instruction is largely individual and new men are therefore enrolled every Monday.

Upon finishing the course in the schools, passing the examinations of the Steamboat-Inspection Service and securing licenses, the students are duly reported to the Sea Service Bureau of the Shipping Board and, if selected, go on pay as Junior Officers of coastwise or South American vessels for two months at $75.00 a month. They are then at liberty to go on full pay at the rate prevailing in the trans-Atlantic service—which, needless to say, is with the prevailing war bonus most attractive. Applicants for the schools are not asked to enlist, as in the navy, nor are they (though expected to sign on for service in the Merchant Marine) held to any stated period in such service. The compensation is so high (apart altogether from the privilege of valued service to the nation in the campaign to defeat the submarine program) that men may be pretty safely counted upon to continue in the service.

The Shipping Board is not asking the War Department for general exemption from the draft of students in the schools. But students who enter upon the work earnestly and with such success as to convince instructors that they will in all likelihood pass the examinations for licenses are certified by the instructors to the district chiefs who are authorized to present the facts in such cases by letter to the local exemption boards, with the suggestion that in view of the great shortage of trained officers these men will be urgently needed for the Merchant Marine.

Candidates for the schools must be American citizens with this exception—that men in course of being naturalized will be accepted upon giving the local inspectors evidence that they will have received their final papers by the time of completion of the course and readiness for the examinations for licenses.

The Recruiting Service has ruled that men in other branches of the Government service will not for the present be accepted for the schools. An exception to this rule has been made, however, in favor of men of the Naval Coast Defense Reserve actually employed on Merchant Marine ships. They may enter the classes if they do so to improve their grades. Men in other branches of the naval reserve and in the militia are not admitted.

In both the navigation and the engineering school the minimum age is nineteen; there is no maximum. Knowledge of the plain rules of arithmetic is necessary.

To be eligible for the engineering schools candidates must have had (1) at least two years' experience as oiler or water-tender, or combined experience of two years in these positions on ocean or coastwise steam vessels; or be (2) a graduate from the engineering class of a nautical schoolship; or (3) a graduate in mechanical engineering from a duly recognized school of technology; or (4) a stationary engineer; or (5) a locomotive engineer who has had six months' experience in the engine department of ocean or coastwise steam vessels; or (6) a journeyman machinist who has been engaged in the construction or repairing of marine steam-engines; or (7) an apprentice to the machinistss' trade with six months' experience in the engine department of ocean or coastwise steam vessels; or (8) an engineer of lake, bay, sound or river steamers; or have had (9) at least three years' experience as fireman on an ocean or coastwise steam vessel.

To be eligible on the score of sea experience candidates for the navigation schools must have had: (1) at least two years' experience in the deck department of ocean or coastwise steam vessels; or (2) at least three years' experience in the deck department of ocean or coastwise sailing vessels; or (3) at least three years' experience in the deck department of sailing vessels engaged in the ocean or coastwise fisheries; or (4) at least one year's experience as mate of steam vessels engaged in the ocean or coastwise fisheries; or (5) two years' experience as master or chief mate of ocean or coastwise sailing vessels of 200 gross tons or over; or (6) one year's experience as master or pilot of lake, bay, or sound steam vessels; or (7) must be a graduate from the seamanship class of a nautical schoolship. Knowledge of navigation is desirable but not necessary.

Men who cannot qualify under the foregoing requirements of sea experience may, nevertheless, have the benefit of a thorough course in navigation in preparation for the Inspectors' examinations for licenses either in the University of California's Extension Classes (one six weeks' course every afternoon except Saturday, from 1 to 5 o'clock, and one seven months' course, Monday, Wednesday and Friday evenings, from 7:30 to 9:30 o'clock) or in the Navigation School conducted in the evenings from 7:15 to 9:15 by the San Francisco Board of Education under the very competent instruction of Lieut. John T. McMillan of the Naval Reserve and the United States Hydrographic Office, himself an experienced navigator. This is a five months' course. The Lieutenant also gives instruction to men in the naval reserve in the afternoons from 1:30 to 3:15. There is a total enrollment in these various classes—Shipping Board, University, and City—of some four hundred men.

Through the courtesy of the State Board of Harbor Commissioners, all the schools are now housed in rooms directly adjoining one another in the Ferry Building. (The Shipping Board is indebted to the University and to the San Francisco Board of Education for generous assistance in equipping its room). The Shipping Board takes care of the men of sea experience and aims to send them upon graduation and receipt of licenses into immediate service as officers. The University and the City schools receive the men lacking in sea experience. The expectation is that upon finishing the course in navigation they will go to sea as cadets or quartermasters and there gain the experience prescribed for licenses. Many San Francisco shipping concerns have expressed to the writer a ready willingness to provide places for the men coming out of these schools.

The most cordial relations prevail between the three schools and their instructors. Inexperienced students are referred by the Shipping Board School to the other schools and vice versa. Students applying to an overcrowded class are referred to one having more room. With the schools thus housed together the instructors have the benefit of conference, as, in a sense, a faculty of nautical instructors. This friendly co-operation of the Shipping Board School, the University Schools, and the San Francsico School in the training of officers for the new American Merchant Marine is a gratifying example of united effort on the part of nation, state and city to meet a great need in the present national emergency.

OUR COVER

The design on our cover this month depicts the new house flag of the Emergency Fleet Corporation and those vessels of 8800-ton deadweight and over will fly this flag with a six foot hoist and a nine foot length. When the present program is completed there will be at least 1200 ships flying this emblem of American's return to the ocean. Sixty years ago American house flags were familiar sights in every port in the world, but of late years they have become very much of an oddity.

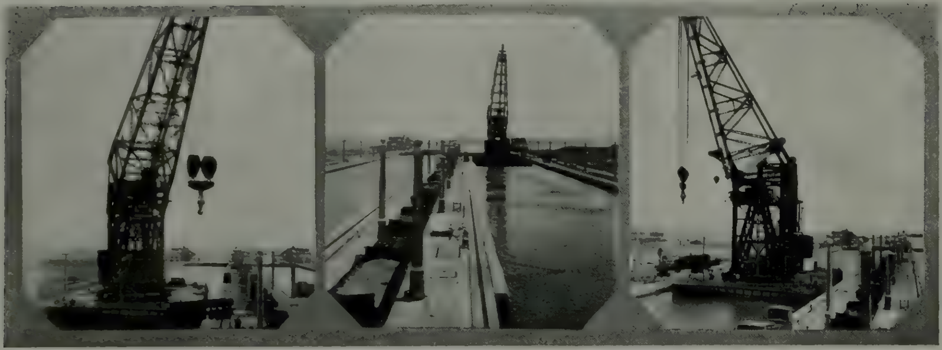

Fig. 2. Fig. 1. Fig. 3.
One of the great Panama Canal floating cranes transferring equipment from one side of Gatun lock to the other.

Uses of the "Hercules" and "Ajax" at Panama

By Frank A. Stanley

NUMEROUS articles have appeared in the American trade journals describing the two floating cranes in use at the Panama Canal, the "Hercules" and "Ajax," and a great deal of controversy and adverse criticism was directed at these machines at the time the jib of one of them collapsed under test. Also, much interest was manifested in the operating of erecting the jibs of these cranes. To accomplish this, the jibs were assembled on the lock wall at Gatun, the crane pontoon with its superstructure was floated into the lock, the water was regulated so that the superstructure would stand at the right height, and then the jib was skidded bodily over the lock wall until it was in the necessary position for the placing of the pivot pins in the holes in the jib and the superstructure.

In the present article some views are presented illustrating a few interesting uses to which these cranes have been put and showing something of their adaptability to various purposes in the line of handling other equipment and assisting in the wrecking operations which are necessary from time to time.

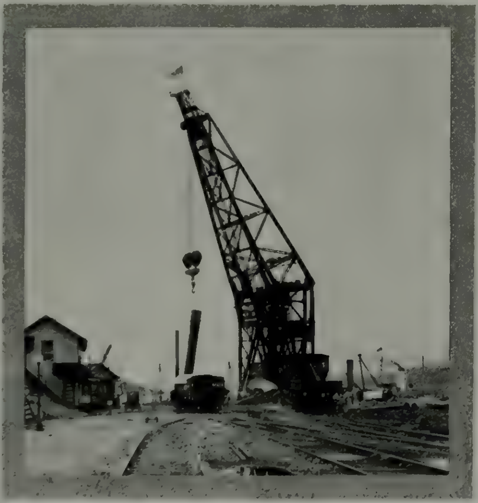

Fig. 6.
The "Hercules" pulling up 6-foot caissons at the reloader wharf of one of the great coaling plants.

The general view, Fig. 1, shows the "Hercules" in one of the locks at Gatun engaged in transferring equipment across the locks, and figures 2 and 3 are closer views of similar undertakings. In figure 2 the crane is illustrated in the act of picking up a steel car and transferring it bodily to the opposite wall of the lock, and Fig. 3 shows a similar transfer of a steam-shovel. Both of these engravings, and particularly the first of the two, brings out clearly the spectacular appearance of the floating crane, which, with its maximum rated capacity of 250 gross tons, can pick up and swing with the greatest ease a steel car, a steam-shovel, or even a large locomotive.

Attention is called especially to the big main sheave-blocks which are strikingly shown in several of the pictures. The sheaves in these blocks are five in number in each block, and they measure 63 inches across the diameter. The blocks themselves are over 8 feet high, and each block is suspended in ten parts of 2-inch steel rope. Instead of the conventional hook usually found under the block, a special triangular form of hook is provided for each block, and when desired the two block-hooks are coupled by the equalizer bar shown, and the hoists are then operated in unison to give the maximum lifting capacity of 250 tons.

Fig. 3 also shows the form of the auxiliary hoist hook, which is a double-barbed affair. This hoist has a lifting capacity of fifteen tons and is used for minor operations.

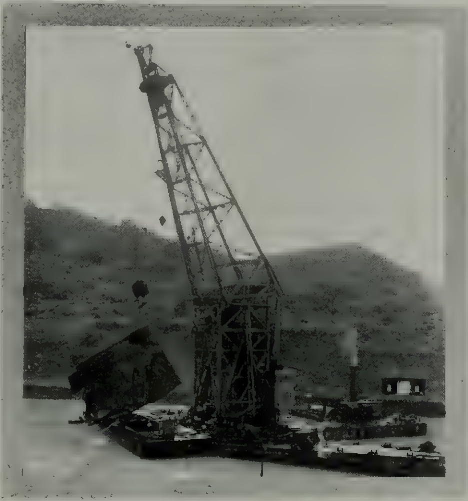

Fig. 4.
Removing the wreck of the drill barge "Teredo" from the canal channel in the Cucarache section.

In the prosecution of important engineering undertakings around waterways involving the use of extensive lines of equipment of various kinds, and particularly where numbers of dredges, drill barges, derricks, pile drivers, and other floating apparatus are utilized, as has been the case during the construction and operation of the Panama Canal, there is always the possibility of some piece of equipment being involved in an accident such as being rammed and sunk, injured by explosion or grounding, etc. It was one of the conditions recognized when the purchase of the "Ajax" and "Hercules" was under consideration, that, in addition to such duties as the handling of heavy pieces of cargo, the lifting of lock gates under emergency, and other heavy crane work, that these two units would be required occasionally for wrecking services. This expectation has been realized upon more than one occasion.

One such instance is represented by the case of the drill barge "Terredo," which was blown up and sunk while operating in Cucarache Channel, the channel being blocked in consequence, requiring speedy removal of the obstruction. Fig. 4 illustrates the "Ajax" removing the smaller portion of the barge, and Fig. 5 shows the "Hercules" raising the boiler from the wreck. This latter picture gives an excellent idea of the size of the superstructure and jib on one of these cranes, the big boiler having the appearance of a watch charm.

Fig. 6 is of interest as showing another kind of reclamation undertaking where the "Hercules" is represented in the operation of pulling up 6-ft. caissons at the reloader wharf of one of the great coaling plants.

It will not be out of place in this article to refer to some of the tests to which these two great cranes were subjected before they were finally accepted by the Canal officials. The requirements as to speed of hoist were as follows: With 250 tons load, 3.5 ft. per minute; 125 tons load, 7 ft. per minute; 62.5 tons load, 14 ft. per minute. Speed of raising or lowering the blocks without load, 20 ft. per minute. While undergoing load tests, the following reaches or overhangs were secured: 250-ton load, reach over side 22.4 ft., over end 22.9 ft.; 150-ton load, reach over side 52.4 ft., over end 61 ft.; 100-ton load, reach over side 81.6 ft., over end, 81.1 ft. The maximum height of the hook above water in the 100-ton position is 126 ft.; in the 150-ton position, 154 ft., and in the 200-ton position, 182 ft.

Fig. 7 illustrates one of a number of tests of the "Hercules" in which a load of 250 long tons was suspended at the rated reach, while the pontoons carried a deckload of 300 tons; the crane being tested, of course, with and without deckload during the entire series of tests.

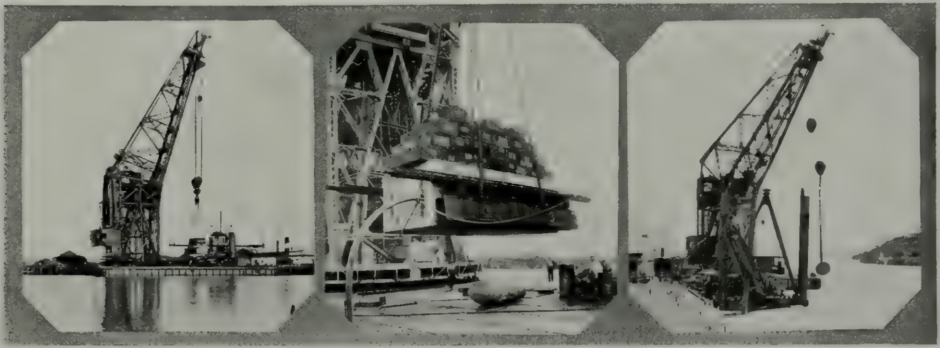

Fig. 7. Fig. 8. Fig. 5.
One of the cranes is here shown undergoing tests and in the right hand picture a large boiler is shown suspended. The latter picture gives an excellent idea of the size of the crane.

The test load for the main hoist consisted, as shown, of two concrete blocks in which 15-inch I-beams were imbedded crosswise, with the ends of these beams projecting from the side of the blocks. These blocks weighed 100 tons, and the additional weight was made up of cast-iron blocks and steel rails to allow the load to be increased gradually to the maximum required. As shown in Fig. 8, the load was carried by four 6x2-inch eye-bars pinned at the lower end to the side girders which held the concrete blocks and secured at their upper ends to a shackle suspended from the triangular hook, which, as seen in Fig. 7, is carried by the equalizer bar connecting the two main blocks.

Fig. 8, by the way, illustrates the "Ajax" undergoing a test in which a load of 275 tons (10 per cent in excess of the crane's rated capacity) was rotated at the required reach. This view shows clearly the method of carrying the additional cast-iron and rail weights upon the main concrete blocks referred to above.

The "Ajax" was the first of the two cranes to be subjected to test, and, after undergoing the normal tests successfully, it was tried out under the overload tests called for by the contract, and during this process the jib collapsed at the back and the entire jib fell. The jib of the "Hercules" was accordingly reinforced before it was put under its overload tests, and a new jib was constructed for the "Ajax" by the original builders and shipped to the Isthmus, there being a delay of nine months before the new jib was erected and finally passed successfully through the prescribed acceptance tests.

Adjusting Compensation for Engineers

A MEETING between shipowners and representatives of the Marine Engineer's Beneficial Association was called at the request of the Pacific Shipping and Maritime Committee of the Associated Chambers of Commerce of the Pacific Coast to consider the proposed demand for increase in wages scheduled to take place on August 15th, but postponed to September 1st at the request of the committee.

The meeting was held in the Merchants Exchange Building, San Francisco, on August 23rd, the following interests being represented: Standard Oil Company, Union Oil Company, Associated Oil Company, the United States Shipping Board, the Pacific Mail Steamship Company, the Pacific Steamship Company, the China Mail Steamship Company, the San Francisco and Portland Steamship Company, the Matson Navigation Company, and representatives of the Marine Engineers' Beneficial Association of San Francisco and Seattle.

The representatives of the shipowners suggested that a classification of vessels be adopted to conform as nearly as possible to the classification in vogue on the Atlantic Coast based upon what is known as "power" tonnage. A committee of three from each interest was finally appointed and given power to act. This committee was composed of A. C. Diericx, Walter Buck and F. N. Barry, representing the shipowners, and W. B. Jackling, Dave Miller and Vincent Carroll representing the engineers.

This committee got together on August 24th with the following results:

The shipowners agreed to accept the schedule as presented by the Engineers, the same to take effect September 1, 1917. It was agreed that this schedule should be binding on both sides during the duration of the war.

It was agreed that the proposed classification and wages presented by the shipowners' representatives was a fair one and the engineers agreed to submit it to their members with the recommendation that it be adopted. If the majority in the Engineers' Beneficial Association decided to adopt the shipowners' schedule, then it was to go into effect November 1, 1917, and remain in force during the war, but in the event of this schedule being rejected by the engineers, the schedule as proposed by the engineers themselves would continue in effect during the period of the war.

The meeting was carried on with the best of feeling on both sides, and those who attended it voiced the opinion that it had resulted in a better feeling all around.

The proposed classification and schedule of wages for marine engineers as submitted by the shipowners' committee to the committee of the Marine Engineers' Beneficial Association, was as follows:

RATES IN DOLLARS PER MONTH

Classification	Chief	First Asst.	Second Asst.	Third Asst.	Fourth Asst.	Jun.
Class "A," 30,001 tons, and over	$275	$185	Sr. $155 Jr. $145	Sr. $135 Jr. $110	Two at $105 ea.	$100
Class "B," 20,001 tons to 30,000 .... Twin Screw over 10,000	$260	$175	Sr. $150 Jr. $145	$130	....	....
Class "C," 10,001 tons to 20,001 .... Twin Screw over 7500	$245	$170	Sr. $145 Jr. $140	$127.50	....	....
Class "D," 7,501 tons to 10,000 .... Twin Screw over 5000	$230	$165	Sr. $140 Jr. $135	$125	....	....
Class "E," 5,001 tons to 7,500 .... Twin Screw over 2500	$215	$160	$135	$122.50	....	....
Class "F," 2,501 tons to 5,000 .... Twin Screw over 1500	$200	$155	$132.50	$120	....	....
Class "G," under 2,501 tons	$190	$145	$130	....	....	....

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A VALUATION PROBLEM

COMMANDEERING ships building for foreign concerns is bound to raise very difficult problems in regard to compensation. A Scandinavian company may be formed to build a ship in America, and shares in that ship may be sold to numerous investors at $300 per deadweight ton while the ship has been contracted for at a price of $150 per deadweight ton. The Scandinavian company will claim that since a profit of 25 per cent may be easily realized on the operation of a steamer even at as high an investment value as $300 per ton, the United States Government should pay enough for the ship to fully compensate the shareholders who have bought their holdings at that figure. The Government, on the other hand, will probably look to the contract price of the vessel as a starting point in securing a basis for settlement. A settlement on the former basis would hardly be good business on the part of the Shipping Board, while a settlement on the latter would constitute an undeniable injustice to shareholders who had innocently and in good faith invested their savings in shipping shares.

Some interesting developments may be looked for along these lines, as foreign investors will probably appeal to their governments to take a hand in the valution of their property in an effort to secure further compensation than the mere return of payments made on account of contracts for vessels.

WAR TAXATION

WE are in receipt of a little brochure entitled "War Taxation" by Otto H. Kahn, which contains much food for thought. Mr. Kahn points out that while the nations of Europe have been fighting for nearly three years and have been under infinitely greater financial strains than this country will be called upon to bear, that these nations have not resorted to extreme taxation of incomes. He says in part:

"Even in Great Britain, whose financial burden is the heaviest of all, whose debt is many times the total of ours and who has loaned about $5,000,000,000 to her Allies, the highest income tax rate, the maximum percentage in the graduated scale of taxation, is today no more than approximately forty per cent.

In the last budget, introduced a couple of weeks ago, the British Chancellor of the Exchequer declined, so I am informed, to consider an increase in the income tax rate, because of the damaging effect which such increase would be apt to have on the country's business and prosperity.

"In France and Germany the burden laid on incomes is much lower than in England. In Canada where war loans have been raised equivalent on the basis of comparative population to what would be more than $10,000,000,000 for America, no Federal Income Tax exists at all.

"Not a single one of the leading European nations, after three years of the most exhausting war, has an income taxation schedule as high as that adopted by the House of Representatives; neither Republican France, nor Democratic England, nor Autocratic Germany. Of these three countries, England has imposed the highest income taxation; yet, the maximum rate in England is almost fifty per cent less than the maximum rate in the House Bill."

The effect of the heavy income tax to be placed upon this country and in addition the excess profits tax will be far reaching. It has always been an axiom of taxation that excessive taxes defeat the end for which they were levied. Capital is naturally guided by the law of self-preservation and will seek channels where the burden to be borne is lightest. In short, the investor will seek tax exempt outlets for his surplus money and the total sum raised by taxation, after a certain critical rate of taxation has been reached, will decline with a continued rise in the rate of levy.

The cry in the halls of Congress to "Let the rich pay for the war" is merely political piffle. The war is not a war of the rich or a war of the poor, it is a war being carried on by the United States and the necessary financial burdens that go with war will have to be borne by all. It is not a question of curtailing incomes. If a man had an income of $1,000,000 a year and the Government took eight or even nine hundred thousand dollars away from him every year, that man would not suffer personally, but the enterprises he was carrying on would languish for the want of new financial blood and the communities in which they were located and through them the country at large would suffer.

But would such an individual or firm wait for the tax gatherer? Would it not be more profitable to put the money in non-taxable securities such as the Liberty Loan for instance? Applying the proposed income tax to large sums gives us some very remarkable aspects of just how the tax will work out. The man with $2,000,000 to invest would have to get returns of 9.21 per cent on his money in order to equal his net return from $2,000,000 worth of war bonds. That is when the tax collector was through with him he would only have 3½ per cent left for the use of his money. He would have to invest $1,500,000 at a return of 8.97 per cent to do as well as with Liberty Bonds, $1,000,000 would have to bring 8.75 per cent; $500,000 at 7.82 per cent; $300,000 at 7.07 per cent; $250,000 at 6.45 per cent; $200,000 at 5.93 per cent; $150,000 at 5.38 per cent, and $100,000 at 5.02 per cent.

Of course, such tax-exempt securities as 4½ and 5 per cent municipal bonds would furnish even more striking examples of the attractiveness of non-taxable securities under the heavy income tax proposed by the Government.

That the rich should be taxed and taxed heavily no one can successfully deny, but there is a point beyond which taxation cannot go without endangering the economic balance of the country. Capital is bound to seek returns but if an adequate return is not in sight it becomes fearful and withdraws from circulation.

THE FLETCHER BILL

BECAUSE they have lower standards of labor, less exacting regulations and are beneficiaries of subsidies from their governments, foreign shipowners are taking a great interest in the Fletcher Bill, S 2733, recently introduced in Congress.

This measure would empower the President to permit foreign ships to enter the coastwise trade of the United States under such conditions as he deems wise.

American companies operating steamship lines on the Pacific are a unit in their desire to do everything within their power to further the progress of the war against Germany. They realize that there is a need of many ships to transport supplies, munitions and soldiers to Europe and that at the same time they must continue to move great volumes of commodities along our coasts and on the great lakes if our industries are to be kept up to the maximum requirements.

They are ready to undergo sacrifices when such are found essential for the common good. But they do not believe any condition will ever exist where they will have to be called on to suffer loss at the gain of foreign shipowners. Nevertheless the activities of foreign interests have forced them to see that foreign interests are not above seeking an unfair commercial advantage over American shipowners, even in these stressful times when the common good should be the only consideration of all the countries opposed to German autocracy.

American shipowners, therefore, are anxious to see the Government fully informed of the hidden dangers in such a sweeping measure as the Fletcher resolution. The Government has its hands full solving innumerable other problems, and it cannot be expected to foresee these dangers unless they are pointed out in time for the enactment of proper restrictions and safeguards.

It is not necessary to discriminate against American ships in order to solve any water transportation problems for the obtaining of victory in this war. If it be found necessary to admit foreign vessels into the American coastwise trade, a just arrangement would be to admit them only under charter to American shipowners. No matter what the exigencies of the occasion this plan could be successfully carried out to meet every requirement.

Reports from Washington that the bill probably will not be taken up for action until next winter indicate that the administration feels that no emergency exists at present. This is fortunate, for it will prevent hasty action that might result in unforseen injustice to American shipowners.

But foreign interests will not remain idle. Only recently representatives of a Candian steamship line sent dispatches to Washington saying that American companies operating to Alaska were failing to handle shipments of fresh fish. This was quickly proven to be untrue, but it was evidence of the means which are being resorted to in order to get the Fletcher resolution passed in its present form.

American lines have built up a coastwise trade through years of service at a great expenditure, and at times have operated as a loss. Their business will be permanently lost if American ships are replaced by foreign ships, even temporarily, unless they are under charter to the American companies.

If permitted to hire coolie labor and enjoy subsidies and other advantages such as foreign ships enjoy, American ships could compete with foreign ships in the coastwise trade. But as long as American laws prevent this, it is only just that American shipowners be protected against an insidious competition that would sweep the American flag entirely from the seas in no time. It is for this reason that proper safeguards should be embodied in the Fletcher resolution before that measure is passed.

"POWER-TONNAGE" SCHEDULE FAIR

ON another page of this issue will be found an account of the meeting recently held in San Francisco for the purpose of adjusting a scale of wages for the engine-room forces of vessels in the Pacific and coasting trades. Attention is particularly directed to the scale submitted by the shipowners' representatives, a scale which was approved by the representatives of the Engineers' Beneficial Association, who promised to urge its adoption at the general marine engineers' meeting which will be held in November to ratify or reject the work of the conference. We understand that the scale as worked out by the owners' representative was first prepared and presented by Mr. A. C. Diericx of the Matson Navigation Company, and that gentleman is certainly to be congratulated on preparing a scale that has much to recommend it, whether looked at from the employers' or the employees' point of view.

In adopting a sliding scale of wages based on "power tonnage," a system is established that is eminently fair and just. In the first place, it insures the engineer who is promoted from a smaller to a larger and more important ship a raise in wages as well as a raise in reputation and self-satisfaction. It provides an incentive for a man to "make good" on the job that he is entrusted with, since promotion means more pay, a broader field in which to prove his mettle, and since the tendency, especially in the trans-Pacific service, is towards larger and larger ships, the future holds forth ample promise for a large proportion of the engineers.

It will be noted from a study of the table that twin-screw vessels are advanced "one class." In short, in many instances, the engineers on a twin-screw ship would receive a higher wage than those on a single-screw vessel of the same power and size.

The results of the adoption of the "power tonnage" schedule taken in toto would give the engineers higher wages than the scale which they themselves asked for, but in a good many instances it would mean a slight drop in wages for the men on medium-powered vessels. This fact may lead to a partial vote in the Marine Engineers' Beneficial Association against the adoption of the scale. It is to be hoped, however, that this organization will see fit to accept the proposition of the owners, since the scale offered is eminently fair, provides a proper reward for merit, and should prove eminently satisfactory to both sides for the term for which it is adopted—the duration of the war.

THE PORT AUTHORITIES' CONVENTION

THE annual convention of the Pacific Coast Association of Port Authorities, held in Portland on September 4th and 5th, was one of the most fruitful gatherings of its kind ever held on the Pacific Coast, the papers presented being highly instructive and covering a wide range of port activities.

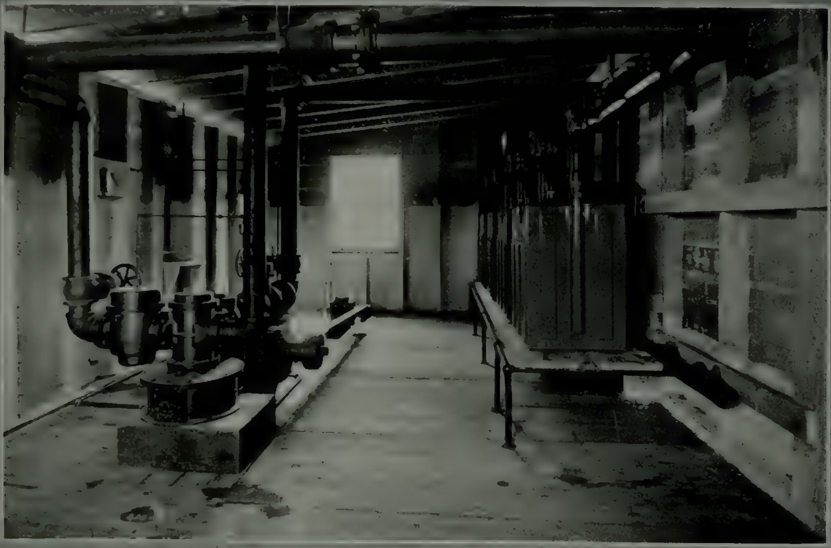
The delegates were welcomed to Portland by Mayor Baker of that city and the president of the Association, Mr. C. B. Moores, who is also Chairman of the Portland Commission of Public Docks, replied on behalf of the delegates.

Representing the Port of Seattle Commission were Judge C. E. Remsberg, Secretary of that body; George F. Nicholson, Chief Engineer; Hamilton Higday, Traffic Manager; E. J. Foreman, Assistant Traffic Manager, and C. A. Ewald of the Commission. From Portland were C. B. Moores, Chairman of the Portland Commission of Public Docks; G. B. Hegardt, Chief Engineer and Secretary of the Association; Captain Archie Pease and George Kelley of the Port of Portland Commission; J. B. Ziegler, representing the City Council; Col. George A. Zinn, Engineer Corps, U. S. A., in charge of improvement projects in the first and second Portland districts, and L. B. Smith and Fred Strong, representing the Portland Young Men's Committee. C. M. Gordon, President of the Los Angeles Board of Harbor Commissioners, was present, while Victoria was represented by C. H. Rust, Chief Engineer, and San Francisco by Frank G. White, Chief Engineer of the State Board of Harbor Commissioners.

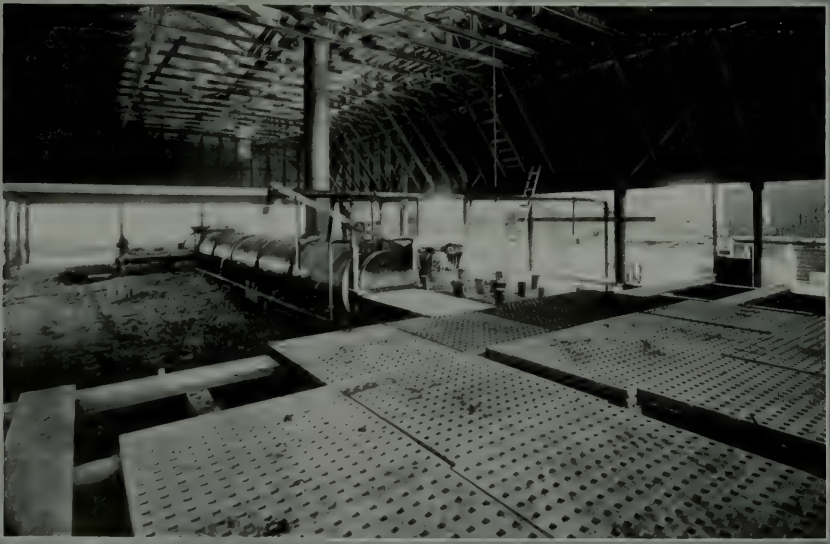
Judge Remsberg read a paper on the "Belt Line Element of Port Terminals" in which he gave some interesting details on Seattle's experiences. Mr. White spoke on the "State Belt Line Railroad of San Francisco," while Mr. Gordon, in a paper entitled "Los Angeles' Solution of the Harbor Belt Line Railroad," traced the legal steps taken to reclaim waterfront land at San Pedro.

Mr. Hamilton Higday, Seattle's Traffic Manager, read an interesting paper on "Bulk Handling of Wheat," which aroused great interest among the Portland delegates, since that port is going in heavily for new grain elevators.

Mr. Nicholson, in his paper on "The Trend of Modern Port Construction," laid heavy stress on the advantages of heavy mill construction for waterfront structures, basing his claims for wood over concrete on the theory that port facilities required frequent changes to be kept up to date, and that the cost of alterations in timber structures were relatively low as compared to concrete or other forms of building.



Upper: Interior of the control house for the gas system at the Hanlon Shipbuilding and Dry Dock Company plant, Oakland, California. Lower: The gas angle and shape furnace with a part of the bending floor shown in the foreground.



Novel Shipyard Furnace Equipment

DAN HANLON, president of the Hanlon Shipbuilding and Dry Dock Company, is again to the fore as a pioneer. Mr. Hanlon is one of those men who when he says that he will try anything once, means it. In short, the Oakland shipbuilder is possessed of a rare gift of initiative coupled with a keen instinct for possibilities and these traits have kept his pioneering habits well within the bounds of reason. Mr. Hanlon has always been willing to back up his own judgment and herein has lain his success.

That the man who first saw the promise of the internal combustion oil engine on San Francisco Bay and built a small tug, the "Marie L. Hanlon," and installed a Bolinder engine in her, who switched boldly from the business of wooden to that of steel shipbuilding, should now adopt some innovations in steel shipyard equipment is not at all surprising. One of Mr. Hanlon's most interesting departures from orthodox shipyard methods consists in the installation of a gas system throughout the works for the feeding of gas to all the furnaces, the system adopted in this case being the Selas system.

Shipyards, as well as other industrial establishments where heating furnaces form a necessary part of the equipment, have generally been using the coal or coke fired furnaces, these being displaced by the oil furnace wherever the latter fuel was low enough in price to compete with the older fuels. Coal and other solid fuel fires are difficult to control and require constant attention if the range of temperatures is to be kept within reasonable limits. Oil burners, of course, are much easier to control, but there, too, are subject to wide variation in temperature unless they are constantly watched. It is quite true, also, that either natural or artificial gas is a variable quantity as it differs widely both in composition and pressure. It is to obviate the effects of these variations in the gas supply that the Selas system is designed.

The Selas system is a one-pipe system automatically and mechanically mixing air and gas in definite predetermined proportions and distributing this mixture under a uniform pressure through the service mains to the burners. This system does away with the operation of the two valves used with gas in an air blast system. The apparatus used consists of four essential parts:

A pressure reducing valve which reduces to atmospheric pressure the gas received through the city gas mains.

A mixing chamber into which the gas and air are admitted in the proper proportions.

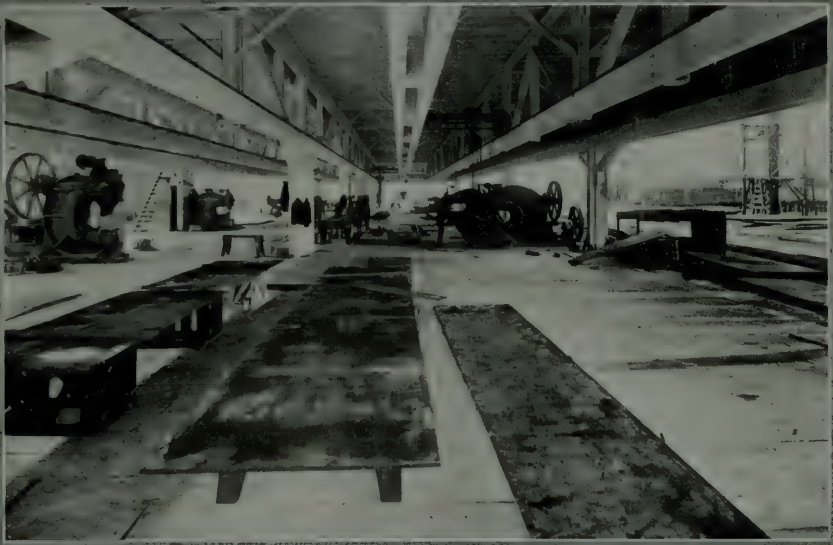
A compressor by means of which the mixture is delivered under pressure to the service mains and thence to the burners.

A pressure governor which controls the delivery pressure and at the same time acts as a by-pass for air and gas mixed by the apparatus in excess of the demand at the furnaces. The cut herewith shows clearly the simplicity and compactness of the apparatus.

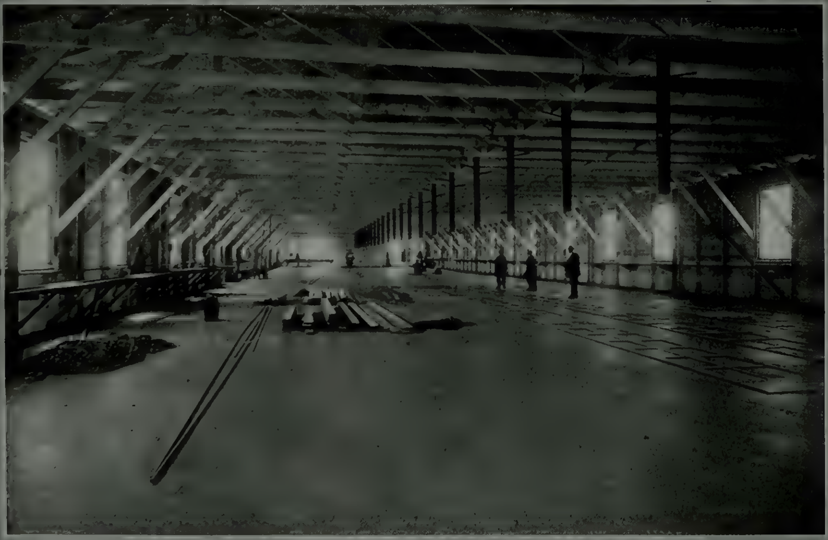
From the city mains gas is admitted to the pressure reducing valve, where the gas, irrespective of any fluctuation in the mains, is reduced to atmospheric pressure. It is then drawn into the mixer which consists of a piston within a sleeve; the sleeve being stationary and the piston moving on a vertical spindle controlled by a diaphragm. Inlet ports for both gas and air and an outlet port for the mixture are cut in both piston and sleeve and by moving the piston to the right or left any predetermined proportion of air and gas can be obtained; clean atmospheric air being admitted to the mixture from outside the building by means of a pipe. This mixture is then drawn into the compressor and compressed to any desired degree, depending upon the class of work performed, the pressure being controlled by the pressure governor, which in turn controls the bypass. When the machine is in operation and no gas is being consumed, the pressure will be built up so that the piston of the pressure governor is lifted and the bypass is wide open. This means that there is no suction in the pipe leading from the compressor to the mixer so that the diaphragm controlling the mixer piston draws same down, closing both the air and gas ports.

As one appliance is turned on, the piston in the pressure governor drops just far enough to allow the proper amount of air and gas to be sent out to the service main; this also causes a suction on the mixer diaphragm; lifting the mixer piston just far enough to allow the proper amount of air and gas to be drawn in. As the demand increases, the piston in the pressure governor drops until the full capacity of the machine is reached, the mixer piston rising proportionately, thus allowing the proper amount of air and gas to be drawn into the apparatus. As the load on the machine is cut down, the reverse action takes place.

In this system there is no gas and no mixed gas and air storage, this being a very important point in its favor. Only a portion of the air necessary for combustion is mixed with the gas in the apparatus, the remainder being taken in at the burners by means of special bunsens, injectors and nipples. The amount of air taken in is below the explosive proportions thus precluding the danger of back-fire or explosions.



The plate shop at the Hanlon yard is a light, roomy structure; each tool being surrounded by a wide expanse of floor space. The mould loft is arranged with high ceiling giving a large amount of storage space overhead.



The Opportunity in the Far East

By Thomas Fox, F.R.S.A., F.R.M.S.

SINCE the outbreak of the European war there has arisen a series of commercial problems that will only reach their solution through a slow process of natural evolution. As the European countries applied themselves to the prosecution of the war their capacity for trading became less and less. There was, of course, great industrial organizations, but this was built up solely in the interests of the war. Great Britain for instance after slowly and reluctantly adapting herself to the extraordinary circumstances forced upon her, performed a miracle of industrial organization and development under the guiding genius of the man who is now Premier, Mr. Lloyd George, backed and supported by the legacy of energy and accomplishment left by the late Lord Kitchener. But this organization, magnificent as it was and is, did not place Britain in a better condition to supply the markets of the world with manufactured products. On the contrary, her exports to ferign markets well off and the entire energy of the nation was centered on an effort to defeat the enemy as speedily as possible.

A similar condition prevailed in the other warring nations. France, with the enemy within her borders, turned gloriously to the task in hand; her best blood was freely offered for the preservation of civilization; and her trade was sacrificed in order that all her power could be concentrated on the defeat of the huns. Such has been her devotion to the great task before her and her sacrificing of every interest to attain the one end, that the phrase "the spirit of France" has taken unto itself a rich and wonderful meaning the world over.

Russia, disorganized and unprepared, beset by the enemy within and without her gates; seething with corruption; her interests betrayed by traitors on every hand; ceased entirely as a factor in the markets of the world.

Belgium, overrun by the enemy, held in the Teuton grasp as in a vice, devastated and tortured, but with an unconquerable spirit breaking through every restraint has given the world the most wonderful spectacle of simple heroism of all ages, but she has nothing to give to the markets of the world.

Germany and Austria, cut off from the free peoples of the world by the great fleets of the Allies, have utterly lost their hold on foreign markets and must necessarily plod a long and weary road before they shall attain their former position in world trade.

Facing these conditions, the markets of the world looked for a new commercial distribution. Particularly they looked to America to supply that portion of their trade wants previously procured from Europe.

Before I left the Straits Settlements and the Federated Malay States, it struck me as singular that the American manufacturers were not making greater efforts to secure a larger share in the trade offered by the markets of these countries. The merchants in the Orient could not secure supplies and they were anxious to get into touch with producing sources that would understand and make an intelligent effort to supply their demands. I believed that the American manufacturer was highly enterprising and was ready to undertake organized preliminary work even at small immediate profit, providing there was a fair chance of his permanently extending his foreign trade. This belief of mine made his apparent apathy to our wants all the more inexplicable.

Frequently comparisons have been made between the methods of the British manufacturer and the American manufacturer, generally to the detriment of the former. We Britishers have regarded our manufacturer as too conservative; as too content to rely upon a reputation made in other days under different conditions. We have held that he was lacking in initiative; that he made no efforts to understand the requirements of his market, but rather followed the retrograde policy of supplying only what he wished under the assumption that if it were good enough for the people of Britain it must be good enough for China, Siam, the Straits Settlements or the Dutch East Indies as the case might be. When we desired to be particularly biting we pointed to what we regarded as the enterprising policy pursued by America and Germany.

It cannot be denied that the British manufacturer was on the whole slow and on this account he lost much of the Oriental trade to Germany. The government and manufacturers of the latter country studied the Oriental markets seriously. Take the Straits Settlements and the Federated Malay States for instance: Germany made it her business to understand what the requirements were. Her merchants learned the Malay language and went into the bazaars to get into personal touch with the Chinese merchants (the Chinese nearly all speaking and understanding Malay). The German merchants inquired regarding the particular lines of goods required and if they could not supply these they sent to Germany and had them made. In many cases the goods had to be specially manufactured. In this manner, Germany won over the trade, or I should rather say she won it through a combination of this policy and the giving of long credits.

As to America, I feel that her merchants really were not more enterprising than were her British cousins. Somehow or other they were given the credit of being so but, on looking closely at the situation and after my visit to this country, I can reach no other conclusion than that we were carried away by our anxiety to find a contrast to the undoubted apathy of the British manufacturer. I say this, not by way of disparagement of the policy and method of the Americans, but merely as a statement of what I believe to be a simple fact.

I do not think that America has gone seriously after the Oriental markets that lie beyond China and Japan. A large percentage of her merchants do not grasp the vastness of the field that lies there. One of the few men I have met on this side who have a real conception of the wealth of such markets as the Straits Settlements, Siam, Java and Sumatra, is Mr. Rosseter, the vice-president of the Pacific Mail Steamship Co. who has made a close and intelligent study of the situation and sees the great possibilities for trade. His faith is demonstrated in a practical way by the inauguration of a steamship service from San Francisco to Manila, Singapore and Calcutta. This is an event of far greater importance to the Pacific Coast of America than appears to be realized and I, for one, regret that greater prominence has not been given this notable enterprise. If San Francisco and Singapore can be linked up directly by a reliable steamship service there is no reason in the world why in time an influential trade should not be built up.

The prize to be gone after is no mean one. Let us look for a moment at the Straits Settlements, and I mention this one of several rich and prosperous countries merely as being more familiar with it than the others. The Federated Malay States depend largely on the tin and rubber industries for their revenue. From the Federated Malay States fifty-five per cent of the world's tin is exported. The tin industry is largely in the hands of the Chinese, who have been the pioneers in the country, and without whose energy and initiative the present development would have been impossible. Within the past six or seven years capital from London and Australia has been attracted and modern mining is slowly superceding the primitive methods of the Chinese. This will mean greater economic strength for the country. Land that was worked by the Chinese in many instances still contains sufficient tin to warrant the sinking of considerable capital to secure it, and several companies are operating on this worked over territory at a good profit. This means, of course, that mineral which would have lain unexploited is being turned into cash to the benefit of the State and the individual.

British Malaya is probably the chief rubber producing country in the world. The area under rubber is increasing yearly while many estates are only now coming into bearing. The effect of this is that the world's output of rubber is increasing rapidly and this fact has given rise to the opinion among many that a fall in the price of rubber may be expected. But the demand for rubber at the present moment is extraordinary and it is safe enough to assume that even after the cessation of hostilities the demand will be such that there will be no fear of a fall in price for some time to come., Then again we have people who claim that the war has shown new uses for rubber where the product has shown highly satisfactory results and that when the war is over and the world returns to something like normal these uses for the material will continue and that still other outlets for the absorption of the crude rubber stocks of the world will be found. In any instance, the rubber industry will still continue to be a great one and as Malaya is one of the best countries in the world for its production the trade and commerce of the country in this commodity are bound to continue to develop.

The success which has attended the rubber industry of the country has retarded the development of general argiculture, but there are signs that the government is anxious to encourage the cultivation of tropical products. There are many crops which could be cultivated which have been sorely neglected and once a movement is made in the direction of growing such products as beans, pepper, rice, spices, etc., on an extensive scale, a large and profitable trade could be established between the United States and the Straits Settlements. Most of these products are already cultivated but in a small way and largely for the purpose of supplying local consumption.

There can be no doubt as to the value of British Malaya as a market for the Pacific Coast, and looking towards that end it would be interesting to see some steps taken to bring the two territories into closer contact with each other and what we have said in reference to the Malay States is equally true of Java, Sumatra and the numerous rich islands of the Dutch East Indies. Surely here is an opportunity worth reaching out for.

But the merchants in the United States must play their part. It will never do to treat foreign trade merely as a means of disposing of surplus stock now and again. It must be regarded in the same light as domestic trade and must stand on an equal footing with it. The man at the other side wants to feel that he can depend on the supplier and if he cannot have his confidence won he will go elsewhere. In answer to this argument, I have been told, "But he must come to us. This is fallacy. Perhaps in these abnormal times the merchants in the Orient are prepared to put up with greater inconveniences and uncertainties than they would in normal times, but it should not be assumed from this fact that they are compelled to come to America for their goods. If sound business relations are to be created and maintained, the word "must" will have to be gotten rid of.

To secure and hold foreign trade there must be proper organization and a thorough understanding of the principles of exporting. The American will never make a success of it if he merely regards it as a sort of side line. If there are two orders, one foreign and one domestic, the former should stand an equal chance with the latter. Remember that the man at the other end is depending on you and if you fail him his confidence is forfeited.

First the merchant has to decide if foreign trade is worth while. If he thinks it is, then he must take it up seriously along thoroughly organized lines. A fine opportunity waits the American merchant in the markets of the Mid-East. That he can find a full demand for his goods in the domestic markets ought not to be a reason for his refusing to court foreign trade. The time will come when the speeding up necessitated by the demands of war will result in the domestic market being oversupplied. When this condition arises, and arise it undoubtedly will, the man who has built up a foreign connection will find himself in a safe position, while the man who has neglected foreign trade will have to suffer from the slump.

One word more. Do not imagine that a sound foreign trade can be built up in a year. It takes time and patience and the merchant should not be disappointed if, at the end of the first year, the results have not come up to his expectations.

The Ideal Marine Power-Plant From a Practical Engineer's Standpoint*

By Renwick Z. Dickie

IN designing a power-plant for a vessel to fulfill a certain object, the first requisite impressed upon the designer is to keep down the first cost to as low a figure as is consistently possible, and experience has shown that in a large percentage of cases this policy has been costly to the owners in the long run.

Probably the most striking example of the evils arising from the policy of sacrificing power-plant efficiency on account of first cost has been the under-boilering of ships to save space and weight. This has led to the use of forced draft in order to secure sufficient steam, and the boilers have been forced to their utmost capacity, while the operating engineers have been taxed to the limit of their strength and ingenuity to keep their plants in operation.

The adoption of oil fuel on the Pacific Coast improved the conditions on many of these under-boilered ships, since it has been found possible to maintain steam with oil fuel with about 25 per cent less heating surface than is necessary for coal. This is due to the evenness of the oil-fuel fire and the constant temperature which can be maintained when it is not necessary to clean fires.

Many of these under-boilered vessels have finally been put into the hands of a practical operating engineer who has been told to use his own judgment in regard to requirements necessary to transform a vessel from an unprofitable to a successful investment.

These changes in the engine and fire rooms of ships have necessitated the expenditure of a large amount of capital, but had they been incorporated in the original plans and specifications of the vessels they would have added very little to the first cost. The simple conclusion to be drawn, therefore, is that when a vessel is in the process of design the man who is going to operate her should be called into consultation.

The man who is going to live on a ship will naturally see to it that his and the crew's accommodations are light and airy, and will wish the vessel to be properly provided with cold storage for long runs. He will also take the precaution of having the engine-room well lighted and ventilated for passing through the tropics. But aside from his own and his crew's comfort, the chief engineer will have an eye to the practical utility of his power-plant and will avoid all features which his experience has taught him mean excessive upkeep figured both in cost to the vessel's owner and work and worry for the engineer and his crew.

Practical engineers are now looking forward to the adoption of the electric drive on vessels, since they realize that the Diesel engine has come to

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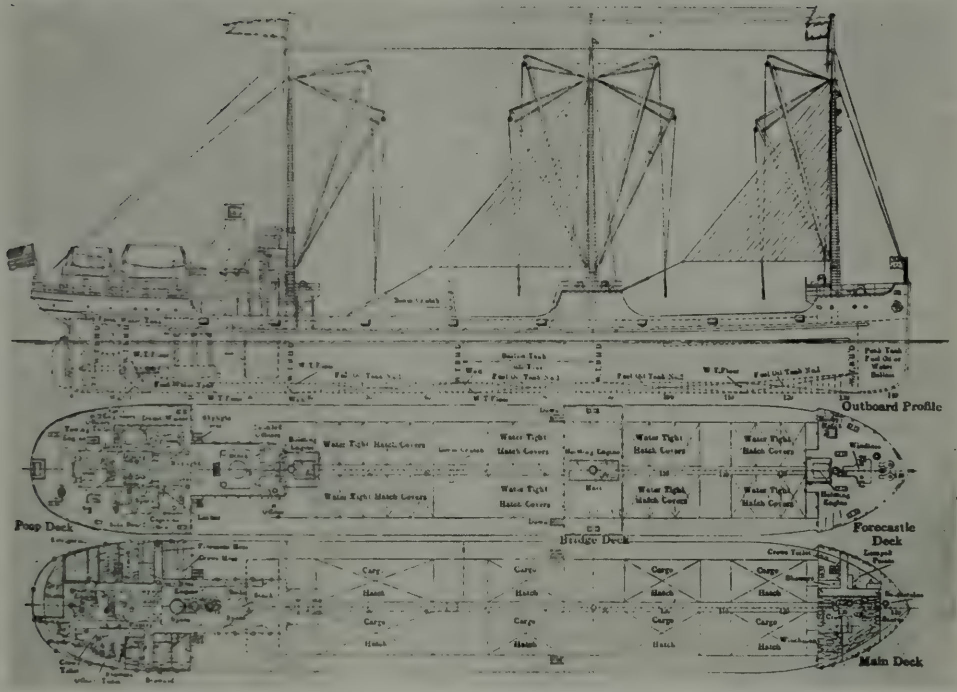
*Note.—The following article was written after a discussion on the subject of the future marine power-plant with Mr. Milton L. Towne, and indicates that practical engineers realize that the Diesel engine has become an important factor in the shipping and marine engineering fields.



Inboard profile and deck plans of the steamer taken for purposes of comparison in the accompanying article. This vessel is a worthy representative of a class well known to Pacific Coast shipbuilders and owners.

stay, and are therefore willing to take hold of this type of power-plant and operate it successfully.

The present oil-engines in use for marine propulsion operate at too high a speed to secure the full efficiency of the propeller. In the past, when figuring on the electric drive, it has been customary to endeavor to use a generator direct connected to a Diesel engine. Such an engine, however, operates at too low a speed for direct connection to a generator, thus necessitating the use of a very heavy and expensive engine and generator. The solution of the problem is to use a high-speed engine direct connected to the generator, thus reducing materially the weight and cost of both the engine and the generator.

The cost of an electric plant with directly driven generators and with a main motor geared down to an efficient propeller speed will vary greatly according to the speed of the motors. Assuming that the stationary engines adopted for driving the generators will turn up about 300 revolutions per minute and the main driving motor about 850 revolutions per minute, the cost of this plant installed will be the same per horsepower as either a steam or a Diesel plant on a direct propeller drive. This is probably due to the fact that the cost of material has advanced far more rapidly than the cost of labor.

One of the things which has held back the adoption of the electric drive on vessels has probably been the large motor necessary to turn a slow-revolving propeller, but by the adoption of a reduction gear between a smaller high-speed motor and the propeller shaft, a great reduction in the first cost can be obtained.

Considerable diversity of opinion will always be created, when the subject of electric propulsion is suggested, as to whether alternating or direct current should be used. As to the proper selection of the type of generators and motors, and whether alternating or direct current, depends entirely upon conditions, and each installation requires individual treatment. The selection depends upon the class of trade in which the vessel is to be engaged, propeller speed, the amount of maneuvering, whether she is to be engaged on short or long runs, the first cost, etc.

On account of the flexibility of control, the direct current lends itself extremely well to that class of work where runs are short and maneuvering is frequent. For long runs where the proper speed remains constant over a long period, the alternating system would probably be selected. If alternating current were used, the source of power would be three phase, 60 or 25 cycles, 220 or 440 volts, and, if direct current, from 250 to 550 volts, the voltage depending upon the size of the power-plant.

While at sea the auxiliaries would be operated from the main power-plant. In addition to the main power-plant it would most likely be an advantage to install an auxiliary set capable of operating the winches and other auxiliaries while in port.

The switchboard for controlling both the generator equipment and motor is very simple and easy for the operator to understand. The power is brought from the generator to its individual generator panel, which has mounted thereon indicating instruments and necessary protective switches. At the switchboard the power from the generators is brought to a single distribution bus, and there would be a panel for the propelling motor which would also have the necessary indicating instruments and control switches. Motor operations such as reversing, changing speed, etc., can be entirely controlled from the panel. The operation of reversing the motor is a very simple one. In case of any trouble with one of the generating sets, the motor could be operated from the other generator. There would also be another panel which would control the auxiliary generating set and also panels for controlling lighting circuits, auxiliary motors, etc.

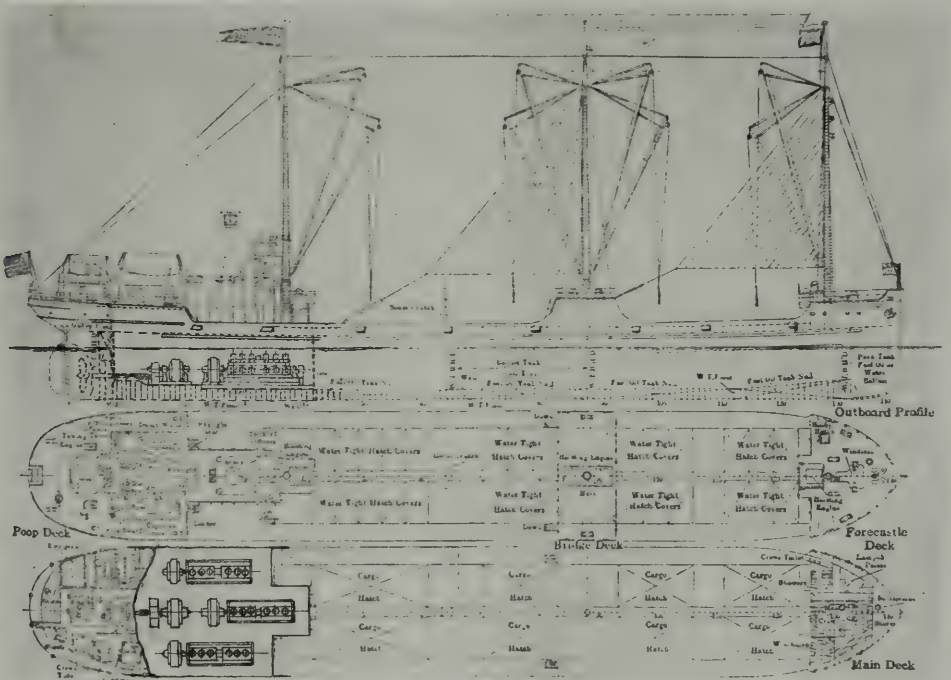
All the transmission wiring for this plant should be carried in water-tight conduits and kept as high up as possible with covers which would be quickly removable and set on rubber gaskets.

The general outline of the marine plant will be as follows:

Either two or more stationary engines turning about 300 revolutions per minute, each directly connected to a generator with a voltage of about 440, and a driving motor working on a reduction gear to give the most efficient propeller speed acting on a single screw.

The adoption of the alternating current will cut down the first cost greatly, and on vessels with a long run a direct current would not be necessary except in the handling of cargo winches. In the case of these winches it has been found better to use direct current in order to use the motor as a brake when lowering, and it may be necessary to install an engine of about 150 horsepower directly connected to a D.C. generator for this purpose.

The use of electricity should be considered as only a means of transmission from the Diesel engine to the propeller that allows for the utilization of the most efficient speed of both. No governor will be necessary on the main driving motor, as the variation in power due to the vessel being



The same vessel as shown on the opposite page fitted with Diesel engines and geared electric drive. For differences obtained in carrying capacity, costs, etc. see statements and tables given in the accompanying article.

in a rough sea would be taken care of by the governors on the Diesel engines.

Some of the advantages of electric propulsion are as follows:

The use of efficient, stationary, high-speed oil-engines of light weight and the selection of the proper propeller speed by using motors connected to the propeller shaft through gearing. The elimination of the reversing feature of the oil-engine, thereby rendering the same more efficient, more reliable, easier to operate, less complicated. The doing away with the necessity of stopping the engine to reverse the propeller, since this can be done with the driving motor. The taking care of changes in load and speed by the governors and throttles of the Diesel engines.

On the trials of the U. S. S. "Jupiter," which was fitted with electric propulsion, it was found that the vessel maintained the same speed with less power than her sister ship, which was fitted with triple-expansion engines, and the reason for this is believed to be that the torque delivered to the "Jupiter's" propellers was continuous, while her sister ship was driven by the intermittent impulses of reciprocating engines.

The advantages of the type of propulsion outlined above in the case of a ferryboat are innumerable, and probably the most striking one that would appeal to the deck officer would be the accurate control over the propelling machinery which could be arranged from the pilot house, thus eliminating the personal co-efficient of the engineer on watch.

The cost of oil has advanced very rapidly in the last two years and operating owners have, in some cases, arranged their new vessels to burn either coal or oil. It is only a short time before the adoption of the Diesel engine will become imperative as the saving in fuel amounts to 75 per cent. The fuel which is furnished to steamers burning oil is no longer the pure crude, but a residue which is left from the crude after some of the ingredients such as asphalt, gasoline and distillate have been extracted and it is found impossible to obtain very high efficiencies in the consumption of this residue under boilers.

This residue, however, makes excellent fuel for Diesel engines as the asphalt, which the oil formerly contained, was probably responsible for the delay in the adoption of the Diesel engine to operate on California oil.

The small amount of electrical trouble is quite noticeable on new ships, and no doubt, should the entire plant be electric, three good electricians will be able to take care of the generators, motors, switch-board, wiring, etc., and the wages of the firemen would amply offset this expense.

In order to illustrate the commercial gain of this type of plant a steamer which was formerly well known on this Coast will be taken for comparison, equipped with her present plant and with the Diesel electric drive as outlined.

The vessel is of steel with a B.P. length of 284 feet, beam of 44 feet and depth of 21 feet 6 inches. She is fitted with two Scotch boilers, fitted to burn crude oil, and a triple expansion engine with cylinders 21, 34 and 56 inches in diameter and 44 inches stroke. At 90 revolutions the engines develop about 1500 indicated horsepower.

The former owners of this vessel have given a statement of her value per ton deadweight carried in a year's service. That is, the total amount of freight handled, the amount received for this freight and the expense of operating the ship over a period of one year; and by the following data it will be seen that should the proposed electric drive be installed, a saving of 100 tons in the original weight of machinery would be effected and one-third the amount of oil would easily give the vessel the same cruising radius and no water would be necessary for the power plant.

	Diesel Electric Drive	Triple Expansion Plant
Indicated horsepower	1500 h.p	1500 h.p.
Weight of plant installed	200 tons (est.)	300 tons
Fuel used per hour per h.p.	.45 pounds	1.5 pounds
Fuel used per hour	2.1 bbls.	7.08 bbls.
Fuel used per day in bbls.	50.4 bbls.	170 bbls.
Fuel used per day in port	8 barrels	26 bbls.
Cost of fuel oil per bbl.	$2.00	$1.80
Cost of fuel per day at sea	$100.80	$306.00
Cost of fuel per day in port	$16.00	$46.80
Days at sea	269	269
Days in port	96	96
Water used per day for power plant	00	3.75 tons
Fuel used per day, tons	7.2	24.39
Weight of fuel carried	220 tons	664 tons
Weight of water carried	50 tons	174 tons
Cost of water, per ton	$1.40	$1.40
Cargo carried in dead weight tons	3668	3000
Value of ship per dead weight ton, one year	$76.00	$76.00
Fuel used in year	14325.6 bbls.	45,730 bbls.
Water used in year for power plant, tons	00	1012.5
Total cost of fuel and water for one year	$28,651.20	$83,731.50
Profits of ship in one year (1916)	$278,768.00	$228,000
Total net profits per year	$333,848.30	$228,000

Over a period of a year in the operation of the vessel, assuming the average cost of fuel to be the same as at that time, she would have an increased carrying capacity of 668 tons and would have netted her owners about $105,848.30 additional through the saving in fuel, water and weight, or a net gain in the commercial efficiency of the ship of about 32.4 per cent.

The Wooden Ship Question

THE territory of the entire Northwest is very much exercised over the developments connected with wooden ship construction by the Federal Government. Newspaper reports have been issued several times of late indicating that the United States Shipping Board might reduce very heavily the percentage of wood construction at first planned. Some reports have been to the effect that no further wood ships would be built under the government programme.

From the best information available it seems that there are two or three arguments being used quite effectively against any rapid extension of the wood shipbuilding programme under government auspices. The first of these is the argument prepared by the Chamber of Commerce of the State of New York, showing the lighter mortality among ships of speed and capable of carrying war armament when attacked by submarines. The argument of this organization was that only about 10 per cent of the attacks on this class of vessels is successful, whereas a percentage of from forty to fifty is pronounced successful in the attacks against low-powered or slower types of vessels.

The second argument presented is the constant labor troubles that are being experienced in the Pacific Northwest, the principal home of the wood shipbuilding industry, and the great difficulty the government is having in keeping the wage on wood ship construction on a fair basis and preventing unending strikes.

A third difficulty has been found in the fact that a great deal of complaint has been voiced against the standard type of ship adopted by the government for wood ship construction and the fact that nearly all designers or builders of wooden ships insist that all other designs are practically useless except their own.

When all authorities on wood construction differ it is natural that the Shipping Board should reach the conclusion that there is the gravest doubt as to the success of any type that might be adopted.

To offset as many of these arguments and efforts as are unfair and as may result in injury to the nation in the hour of great need, it has been suggested by the Portland Chamber of Commerce that a conference of all wood shipbuilders of the entire Pacific Coast be held at an early date, time not yet fixed, when an organized movement should be started to protect the rights of the industry. This conference will be invited soon, and it is expected that out of it will come some systematic effort to present the legitimate advantages of the wood ship to the powers that be.

As an answer to the New York argument in regard to the vitality of low-powered or slow ships, it is pointed out that the nation needs all the ships that may possibly be built, regardless of speed. If, in the ultimate strangling of transportation across the Atlantic, it is found inexpedient to place in this traffic slow ships, it is held in the Northwest that the slower ship may be substituted for the numerous needs in water transportation confronted by the government elsewhere than in the submarine zone, and that, in proceeding thus in vigorous manner, a higher percentage of the faster ships might be available for submarine zone service.

In respect to the labor difficulties of the Northwest it is also believed by the builders and material manufacturers in this territory that most of the trouble is the product of governmental policies and governmental expressions, whether official or otherwise. The labor agitators in the Northwest are proceeding on the theory that all they have to do is to make demands and the government will comply therewith because of the powerful influence exercised upon the administration by organized labor forces. No heed seems to be taken of the final day or reckoning, when bills must be paid, and no regard seems to be given to the fact that these strikes and labor difficulties delay actual construction, thus strengthening the cause of the enemies of this country.

As to the types of ships that are, or may be, constructed, it is pointed out that the Pacific Coast, which has the longest experience of recent times in wood construction, was not given much of a voice in designing the ships that had been finally adopted, but, on the contrary, the plans were prepared by people who had very little experience in wood shipbuilding. By following more closely the standard types that have been well proven on the Pacific Coast, it is the belief of the people of this territory that relatively little difficulty would be confronted today in regard to the type of ship that the government might build.

It is held absolutely certain that the need of an organized propaganda in behalf of this industry in these times must be conceded. Without this organized movement, calling upon all interests that should be reached by fair and sound arguments, a partial abandonment of the wood ship may reduce the possibilities of payroll and business in this territory materially.

THE "GENERAL WILLIAM M. GRAHAM"

The mine planter "General William M. Graham" was launched August 29 at the yard of the New York Shipbuilding Corporation. This event is the first fruits of the long series of launchings called for in the extensive shipbuilding program of the Federal Government which calls for the construction of large numbers of ships, not only for the navy, but for the army and the Emergency Fleet Corporation as well. The keel of the "General William M. Graham" was laid immediately after the declaration of war in April, and at time of launching the ship was 82 per cent completed. At the present time the New York Shipbuilding Corporation has under construction for the Government the battleship "Idaho," which was launched the latter part of June; twenty-four merchant ships for the Emergency Fleet Corporation, and ten torpedo boat destroyers for the navy.

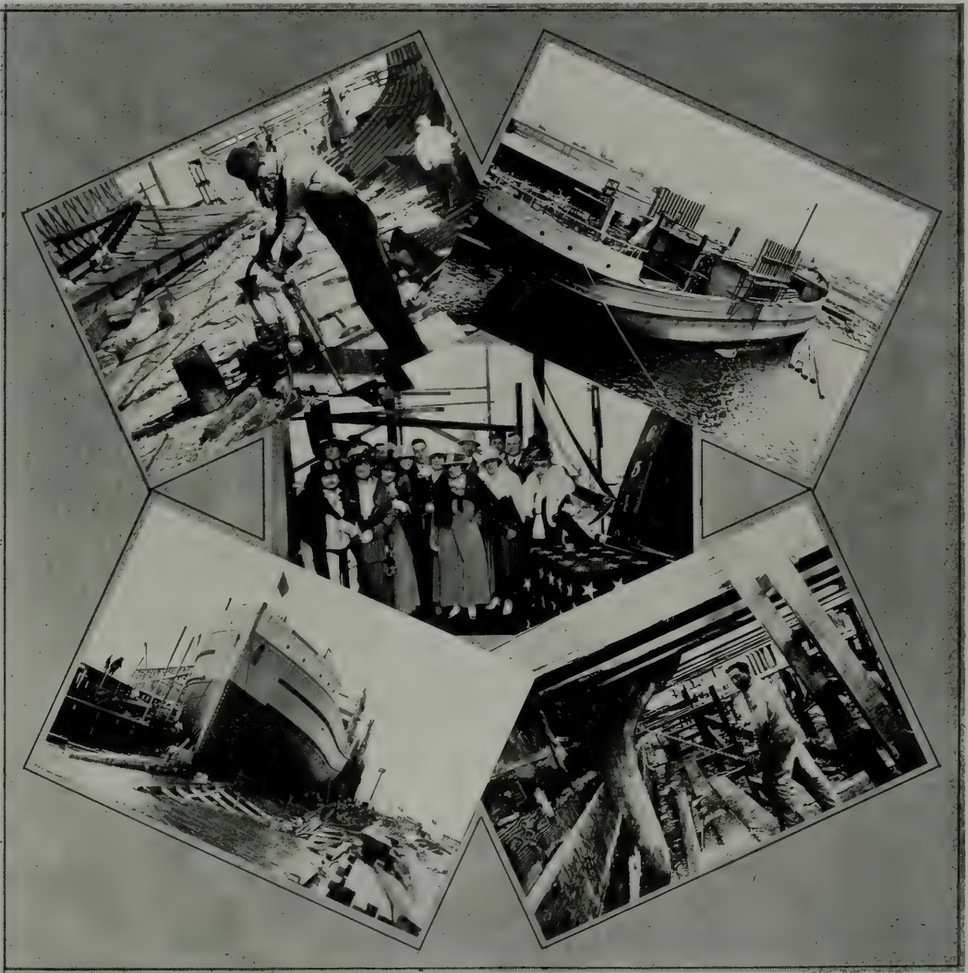
The launching party consisted of Miss Mary Graham Burrage of Contoocook, N. H., daughter of Captain Guy H. Burrage, U. S. N., sponsor; Mrs. Guy H. Burrage, Dr. and Mrs. Carroll S. Alden, Major C. B. Drake, Major H. M. Fridley, Capt. P. N. Merzig and Miss Dorothy Fridley, daughter of Major H. M. Fridley. Miss Burrage is a granddaughter of Gen. William M. Graham, for whom the ship was named.

Launch of the "General William M. Graham" at the plant of the New York Shipbuilding Corporation, Camden, New Jersey.

TWO INTERESTING STEAMERS

The new steamers "Edna Christenson" and "Lucinda Hanify" have been launched at Charles E. Fulton's yards at Wilmington, Cal., and are now having their machinery installed.

The vessels were designed by D. W. & R. Z. Dickie, and are 263 feet over all, 222 feet between perpendiculars, and 44 feet beam moulded. They are double-ended steam lumber vessels, and have a capacity of about 1,500,000 feet of lumber. These vessels are finer aft than the usual steam schooner on this coast, and an effort has been made to keep the floors as flat as possible in order to get better lumber stowage.



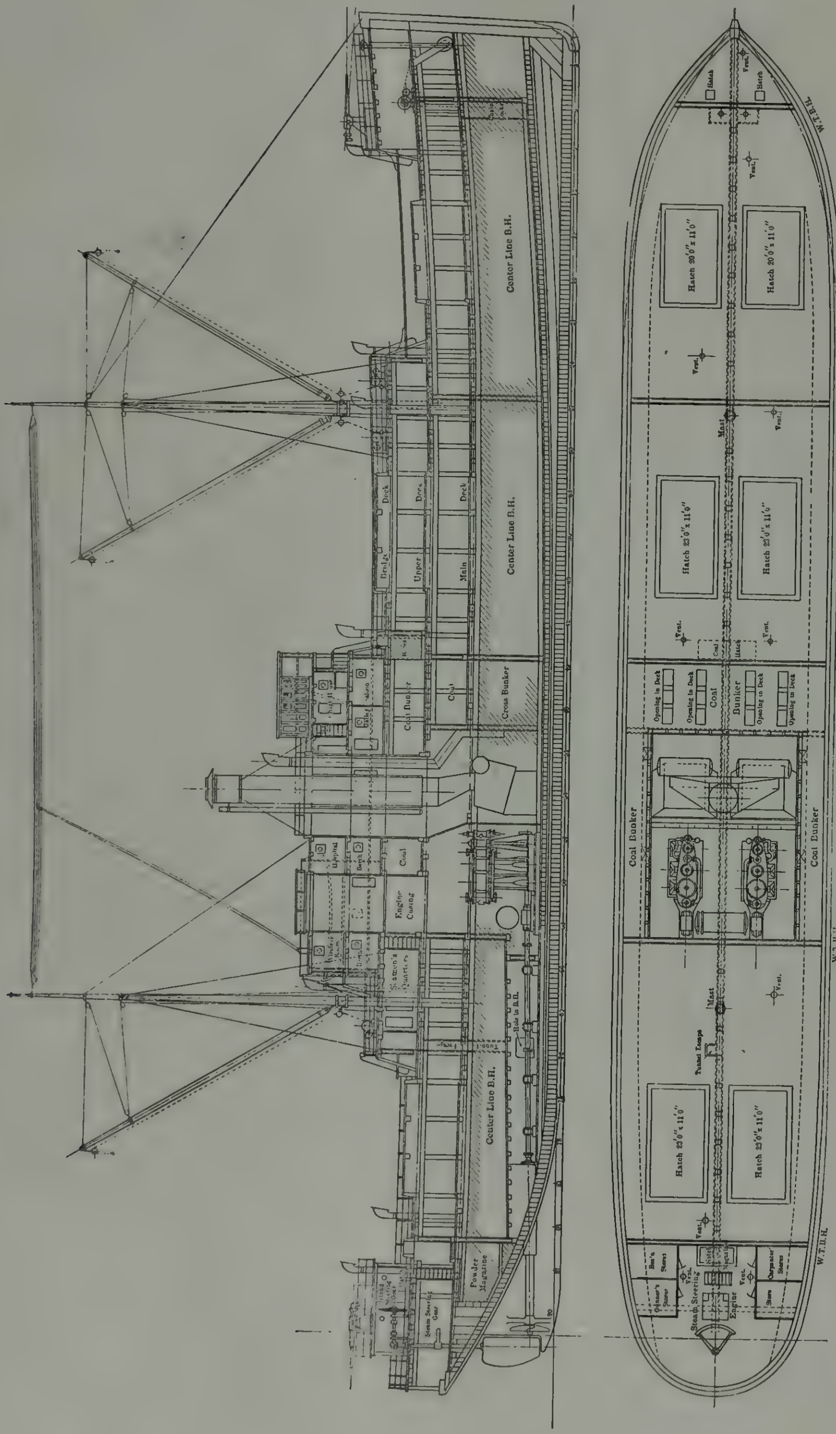
Construction and launching pictures of the "Edna Christenson and Lucinda Hanify" at the Charles E. Fulton yard, Wilmington, Cal. It will be noted that these vessels were launched bow first.

They were both launched recently and are at present having their boilers installed at Wilmington. The boilers were bought direct by the owners, and are of Ward water-tube type. They have allowed 4 sq. ft. of heating surface per indicated horsepower, the idea being that should these vessels burn coal they will have ample boiler capacity.

The Ward boiler was first used on this coast in 1892, in the U. S. S. "Monterey," in which was installed four Ward boilers and two Scotch marine boilers. These were severely tried out by the Government, and the Ward boiler showed up better than the Scotch boiler.

The engines are being built by the Main Street Iron Works of San Francisco, and have cylinders 16x27x42"x33" stroke which will give about 1175 indicated horsepower maximum. The engines will be installed in San Francisco, although the shaftings, etc., have already been installed at Wilmington by Mr. James Pendergast, Superintending Engineer for Sudden & Christenson.

These vessels have been sold to the French government, and on completion will be taken over by their new owners, provided the sale is sanctioned by the Shipping Board.



Longitudinal elevation and deck plan of the "Hough" design ship. This design has caused a great deal of controversy among ship designers and others. The construction of the bottom and the center line bulkhead are radical departures from the usual wooden shipbuilding construction.

A Much Discussed Design

ALL of the plans presented to the Shipping Board for standard wooden ships have met with much criticism, some of which has been fairly stated on excellent reasoning and is therefore valuable; while, on the other hand, there has been a great deal of nonsense published in the popular magazines both for and against the wooden ship as an adjunct to steel construction during these times when the demand is for "Ships, ships and more ships."

In Collier's for September 8th, a Mr. Lincoln Colcord runs riot with a strange mixture of half-truths and grave errors. He accuses Mr. Denman and the original Shipping Board of having wasted four months of precious time. This, of course, is not so. Colonel Goethals and Mr. Denman had a prolonged controversy, but this disagreement did not prevent the organization which the Shipping Board had built up from going ahead with the work in hand. Again Mr. Colcord heaps a great deal of abuse on the head of Mr. Edward S. Hough, whose design is being used for a portion of the wooden craft in the Shipping Board's program. When Mr. Colcord states that "A couple of young mining engineers, it seemed, had carried the project to Mr. Denman and Mr. Denman had welcomed it with his best landlubberly approval. The so-called 'Hough' design was the result"—it becomes quite evident that the design he is abusing is not the "Hough" design at all, since the latter had nothing whatever to do with the project of the young mining engineers in question.

The Hough design, as depicted herewith, is calculated to secure speed in construction at a minimum cost, and, while it has not met the unqualified approval of shipbuilders, it certainly possesses points of great merit, and criticism of radical departures from accepted practice are always to be expected, and when arising from sources capable of criticizing intelligently, are highly useful in a constructive sense.

The Hough plans call for a schooner-rigged vessel of the 'tween-deck type, there being the usual two pole masts and typical Western cargo-handling booms and gear. The length over all is 286 feet, length between perpendiculars 276 feet, moulded beam 45 feet, beam over planking 46 feet, depth moulded 28 feet, deadweight capacity 3500 tons, and horsepower 1400 indicated. Ship curves have been eliminated as far as possible and straight-line work has been substituted. As far as the midship section remains practically unchanged, the bottom is V-shaped, and the sides are flat. This allows of the majority of the frames being made up of straight 12" by 12" timber. This "straight work" means that planking and ceiling timbers require practically no hand work. The general arrangements for the accommodation of ship and gun crews and officers are similar to the other Government designs for wooden vessels.

The vessels are to be twin-screw, being fitted with either triple-expansion engines or turbines. Steam will be furnished by two boilers operating under forced draft. There are five transverse bulkheads below the main deck and six in the 'tween-decks. The inner bottom extends from the collision bulkhead right aft and this space is subdivided as shown in the plans. The inner bottom is utilized for water ballast.

A feature of the ship is the longitudinal centerline bulkhead which extends from the forward to the after collision bulkhead and to the main deck. The bulkhead is built up of 6 by 8-inch edge-bolted timber, and is faced on both sides by 4 by 12-inch planking worked diagonally and landing on continuous sills at the top and bottom. This bulkhead is not watertight.

There are three sets of twin hatches and six 5-ton cargo booms. Fresh water is provided for in steel tanks of an aggregate capacity of 110 tons. There is the usual electric-light plant, steam winches, capstan, windlass and steering gear, ice machine, heating, pumping and drainage systems, etc.

The keel is 12 by 18 inches, fastened with 1¼-inch bolts clinched over rings. The keel is fastened to the center keelson and to the top floor timbers by one 1⅛-inch drift bolt in each bay; two 1¼-inch headed bolts driven from inside and clinched over rings at bottom of keel in each bay and two 1⅛-inch drift bolts are driven from inside and clinched over rings. The keel is protected by a 3 by 18-inch shoe.

The stem is 18 by 24 inches and is scarfed to a natural knee at the forefoot. The apron is also 18 by 24 inches and is made in one length. The stern post is 48 by 18 inches, bearded to 12 inches at the afterside. The bottom is fitted with a cast steel shoe carrying the lower rudder pintle, and the top is chocked solid at the deck beams. The rudder trunk is fitted with a round, lead sleeve. A lignum vitae lined cast-steel bearing is placed at the bottom of the sleeve and a cast-iron stuffing box at the top. The rudder is built up of two ½-inch steel plates set 24 inches apart and stiffened by horizontal web plates and angles, the rudder stock being of forged steel.

The side frames are double 12 by 12-inch spaced 36 inches centers, and extend from bilge to upper deck. Cant frames of the same dimensions are built up at the ends of the vessel and fitted to the deadwood. The floor timbers are double, 12 by

12 inches, butted and secured by an anchor stock piece the same width as the frame. The top timbers are single, except in way of the machinery, and are 12 by 12 inches and in one length.

Bottom timbers and heels of frames are fastened together by two 1-in. screw bolts with plate washers under head and nut. At heels of frames, the bays are chocked and made watertight with a stopwater at each side of the chock. Each anchor stock piece is fastened to a bottom floor timber by two 1⅛-inch screw bolts on each side of the center. Under the machinery the top floor timbers are doubled, and the spaces between the top and bottom floors are chocked in solid.

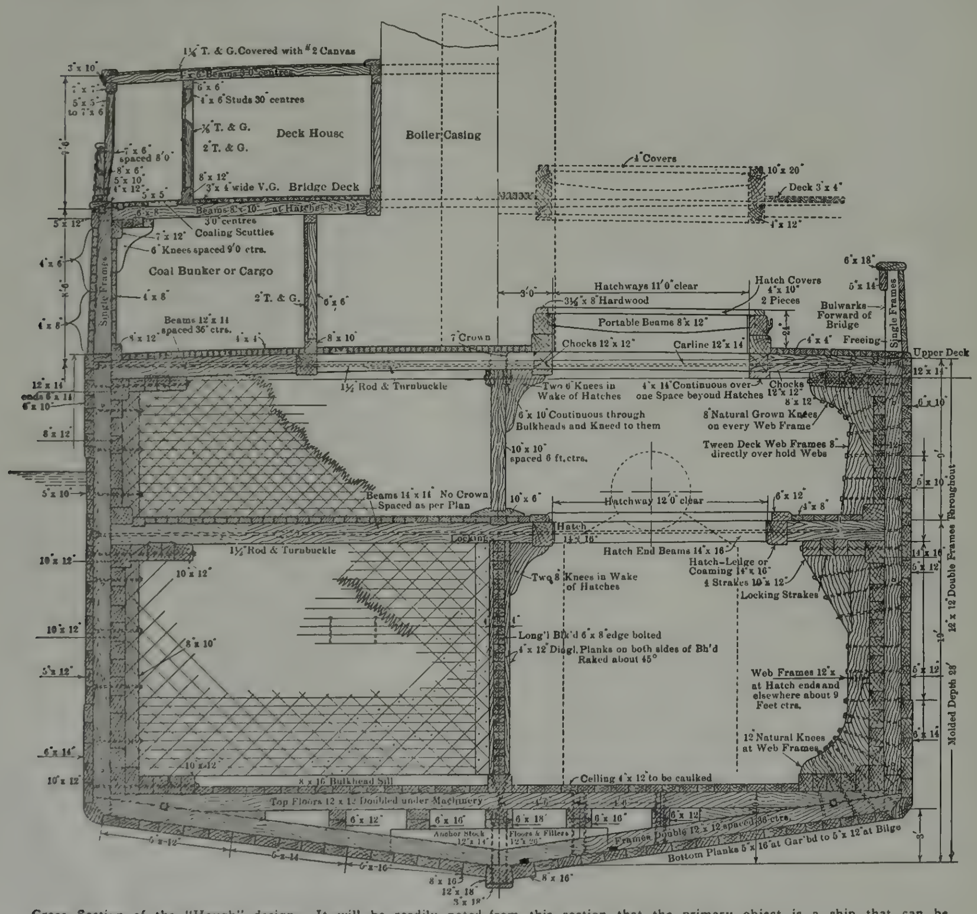
The side ceiling is 10 by 12 inches, the three upper and bottom strakes being scarfed 7 feet. The bilge ceiling consists of four strakes 10 by 12 inches and one strake built up of two pieces 10 by 18 inches with 8-foot laps. All four strakesare edge-bolted and fastened to the floors.

The garboard strake is 8 by 16 inches, edge-bolted to the keel, with ⅞-inch iron in alternate frame spaces. It is fastened to every frame with four 1-inch by 20-inch buttonhead bolts with the heads countersunk and cemented.

The bottom and side planking is 5 inches thick, varying from 16 inches in width at the garboard to 12 inches at the bilge and from 12 inches to 10 inches at the sides. Several strakes of 6-inch planking are provided at the bilge and wales, as shown on the midship section.

In addition to the longitudinal and transverse bulkheads and double bottom, the hull is further strengthened by iron strappings which extend from well forward of No. 1 hatch to abaft of No. 3 hatch. Diagonal iron straps, ½ inch by 4 inches, are let into the outside of the frames and inclined at 45 degrees each way. These are fitted so as to meet at the top butt in every other frame space.

The diagonals are connected at the top butt by two ⅞-inch rivets and at each crossing by one 1-inch fitted bolt. They are also fastened to each


1¼" T. & G. Covered with #2 Canvas
3" x 10"
7" x 7"
5" x 5" to 7" x 6"
6" x 6" Beams 3'0" centres
6" x 6"
4" x 6" Studs 30" centres
⅞" T. & G.
2" T. & G.
Deck House
Boiler Casing
7" x 6" spaced 8'0"
8" x 6"
5" x 10"
4" x 12"
5" x 5"
8" x 12"
3" x 4" wide V.G. Bridge Deck
6" x 8"
Beams 8" x 10" at Hatches 8" x 12"
3'0" centres
5" x 12"
7" x 12"
Coaling Scuttles
6" Knees spaced 9'0" ctrs.
Coal Bunker or Cargo
4" x 6"
4" x 8"
4" x 8"
Single Frames
2" T. & G.
6" x 6"
Beams 12" x 14" spaced 36" ctrs.
8" x 12"
4" x 4"
8" x 10"
7" Crown
4" Covers
10" x 20"
Deck 3" x 4"
4" x 12"
6" x 18"
5" x 14"
3'0"
Hatchways 11'0" clear
3½" x 8" Hardwood
Hatch Covers 4" x 10" 2 Pieces
Portable Beams 8" x 12"
Bulwarks Forward of Bridge
Chocks 12" x 12"
Carline 12" x 14"
4" x 4"
Freeing
Single Frames
Upper Deck
12" x 14"
1½" Rod & Turnbuckle
Two 6" Knees in Wake of Hatches
4" x 14" Continuous over one Space beyond Hatches
Chocks 12" x 12"
8" x 12"
6" x 10"
6" x 10" Continuous through Bulkheads and Kneed to them
8" Natural Grown Knees on every Web Frame
Tween Deck Web Frames 8" directly over hold Webs
10" x 10" spaced 6 ft. ctrs.
12" x 14" ends 6" x 14"
6" x 10"
8" x 12"
5" x 10"
Beams 14" x 14" No Crown Spaced as per Plan
10" x 6"
Hatchway 12'0" clear
6" x 12"
4" x 8"
5" x 10"
Locking
Hatch 14" x 16"
1½" Rod & Turnbuckle
Hatch End Beams 14" x 16"
Hatch-Ledge or Coaming 14" x 16"
4 Strakes 10" x 12"
Locking Strakes
14" x 16"
5" x 12"
10" x 12"
10" x 12"
Two 8" Knees in Wake of Hatches
10" x 12"
8" x 10"
4"
Long'l Bk'd 6" x 8" edge bolted
4" x 12" Diagl. Planks on both sides of Bh'd Raked about 45°
5" x 12"
Web Frames 12" x at Hatch ends and elsewhere about 9 Feet ctrs.
5" x 12"
12" Natural Knees at Web Frames
6" x 14"
6" x 14"
10" x 12"
10" x 12"
12" x 12" Double Frames Throughout
Molded Depth 28'
8 x 16 Bulkhead Sill
Ceiling 4" x 12" to be caulked
Top Floors 12 x 12 Doubled under Machinery
6" x 12"
6" x 16"
6" x 18"
6" x 16"
6" x 12"
Anchor Stock 12" x 14"
Floors & Fillers 12" x 20"
Frames Double 12" x 12" spaced 36" ctrs.
Bottom Planks 5" x 16" at Gar'bd to 5" x 12" at Bilge
5" x 12"
6" x 14"
6" x 16"
8" x 16"
12" x 18"
3" x 18"
8" x 16"

Cross Section of the "Hough" design. It will be readily noted from this section that the primary object is a ship that can be practically turned out in the mill as far along her length as the midship section extends.

frame timber by a 1 by 10-inch countersunk head blunt bolt. The bottom is securely fastened at the bilge corner.

At the main and upper decks are clamps and shelves. The clamp at the main deck is 14 inches by 16 inches, the shelf consisting of four strakes each 10 by 12 inches; two strakes being locked 2 inches into the beams. The upper-deck clamp is 12 by 14 inches, while the shelf strakes, of which there are four, are 8 by 12 inches.

The upper deck beams are 12 by 14 inches, spaced about 36 inches centers and have a 7-inch camber. They are doubled at the hatch ends and boiler openings. Half beams are landed on a fore-and-aft sill, 4 by 14 inches, and pulled up to the deck coamings by screw bolts.

The main-deck beams are 14 by 14 inches, spaced about 48 inches centers, doubled at the hatch ends. The maindeck ('tweendeck) is laid solid with 4-inch by 8-inch planking and calked.

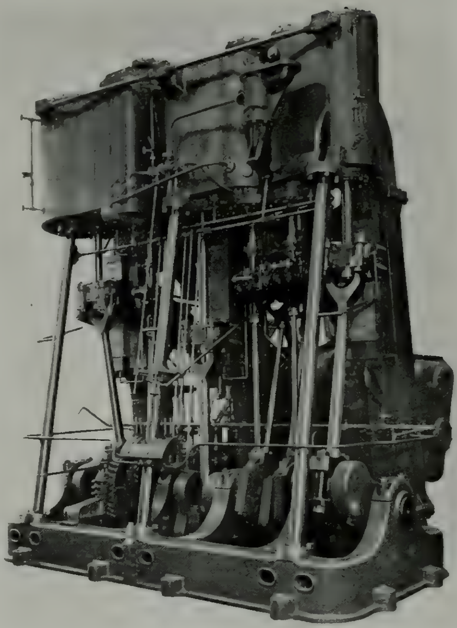
Tie rods 1½ inches diameter are fitted from the sides of the vessel to the hatch sills at the upper and main decks. Two are provided in the way of each hatch. At the hatch end and at every fourth beam between hatches the tie rods extend across the vessel and are fitted with turnbuckles.

Web frames are built at the hatch ends and elsewhere spaced about 9 feet centers. They consist of vertical pieces butting against the knee at the bilge corner and the upper deck, and are fastened together so as to make solid work.

A CAREFULLY DESIGNED STEAM ENGINE

The Main Street Iron Works has just completed a unit of a new type of vertical triple-expansion marine engine of 1200 estimated horsepower when operating at 120 revolutions per minute and using steam at 225 pounds boiler pressure. The engine has a 16-inch in diameter high-pressure cylinder, 27-inch intermediate, and 46-inch diameter low-pressure cylinder, the common stroke being 33 inches. The engine now finished is being installed in the steamer "Edna Christenson," while three others are being built for the steamers "Lucinda Hanify," "Catherine C. Sudden" and "Ann Hanify." The cylinders in these engines are independent of each other, but are tied together on the front side near the cylinder heads by a tie rod, the cylinders being supported by three back and three front columns. The high and intermediate pressure cylinders are fitted with piston valves, and the low-pressure cylinder has a double-ported balanced slide-valve with a balance piston on the valve stem.

The back columns are of box section extending from the bed plate to the cylinders, and are held together with tie frames, also of box section, which are placed near the tops of the columns. The crosshead guides are of the locomotive type and are cored out for water circulation. The bed plate is of box section, having six main bearings, while the thrust block is also bolted to the bed plate. The thrust block has five thrust collars lined with babbitt and cored out for water circulation.


A carefully balanced reciprocating engine design. This 1200 h.p. unit, designed and constructed by the Main Street Iron Works of San Francisco is being installed on the steamer "Edna Christenson."

A new feature of this engine is that it has a "Weir" Uniflux Condenser with cast-iron shell which is bolted to the back of the high and intermediate pressure back columns and supported by brackets from the bed plate. The air pump, which is of the Edwards type, two bilge pumps and two feed pumps are bolted to the side and placed on the low-pressure back column, and are driven by links from the low-pressure crosshead.

The crankshaft is of the built-up type with cast-steel webs shrunk on and pinned. The connecting rods are of the usual type with forked ends for crosshead brasses and tee end for cast-steel crank-pin shells lined with babbitt and bolted to the same.

These engines represent a careful adaptation of the structural methods and principles followed out in the case of far larger units. In short, a successful effort has been made to adapt all the economic arrangements followed out in the largest marine installations to a 1200-horsepower engine, and the results have been highly gratifying.

Harmony of Interests Essential

THE following words from the pen of one of the Northwest's business men who has always been keenly interested in shipping problems, sound a timely warning against Americans being carried away by enthusiasm naturally engendered by the great shipbuilding program being carried out by the United States Shipping Board. It is one thing to build a great fleet out of money taken from the public treasury, but it will be quite a different thing to place these vessels on the high seas under the American flag and at the same time on a sound competitive basis with the ships of other nations.

We agree thoroughly with the writer of the paragraphs below that if radical changes in either our present laws or our present business methods shall prove necessary in order that America can continue in her present great start on the seas, that the present is the most opportune time for educating our people up to the necessity of changed laws and methods to meet changed conditions. If this thing is carried through during the present abnormal conditions, when these conditions due to war shall have passed away, our merchant marine will continue to grow and prosper. If, however, the American people have not been prepared and are allowed to continue to manifest indifference towards maritime matters, the merchant marine which has so suddenly prospered under war conditions will dwindle just as quickly with the coming of peace.

The emergencies which have arisen on account of the European war have brought before our people the great need of a merchant marine, and has shown the tremendous weakness in our system. Even under the trying conditions which must prevail in Great Britain, our English friends are, as always, fully alive to the importance of a merchant marine under their flag which will be superior to ours and every influence which can be is continually brought to bear upon legislation to break down home protection on our shipping industry. Foreign bottoms have been admitted to register under our flag with certain restrictions, but some of these restrictions have been withdrawn and now there is an attempt being made to break down the coasting navigation law, the last protection we have for American shipping. Great Britain and the other countries are more alive to the fact than are the people of the United States, that through their merchant marine they find the greatest source of trade extension and supply of funds wherewith to build up their treasures. We of this country can produce, but get no benefit from the control of transportation. Our immense inland population is only recently awakening to the fact that this country is entirely dependent upon foreign countries for the means of reaching export markets, and from now on there should be instituted a plan of education throughout this country tending to bring the people to the full realization of what a merchant marine means to a nation.

What little shipping we have had in recent years has been exploited most by foreign exporters. We have been dependent upon forms of charter partys, gotten together in the interest of the charterers. A lack of knowledge of the correct situation with regard to manning our vessels, has brought into existence a seamen's bill which in many respects is obnoxious. Our shipping people have themselves to blame for many existing conditions which are adverse to the best interests of the industry, due to the fact that so many conflicting selfish interests are urged whenever the matter of merchant marine is under discussion.

If the Maritime Committee of the Pacific Coast Associated Chambers of Commerce can be successful in harmonizing the shipping interests in this country along any specific lines for the general welfare of the shipping industry, they will certainly have accomplished a great good.

I cannot help but believe that when the war is terminated the time will come when our American ships will need, more than ever before, subsidy or Government aid in some proper form, in order to enable our ships to compete with the ships of the Orient and Europe, for I am prone to believe it will not be a competition of ships, which will result in the survival of the fittest, but rather a competition of governments to determine which government shall make its ships the fittest. Hence it behooves our people to study the problem and prepare the way for such legislation as will enable us to take care of our own.

In order to avoid the undue hampering of ship work due to labor conditions arising, an agreement was entered into on August 20th by representatives of the Navy Department, the Emergency Fleet Corporation and of the American Federation of Labor providing for the rapid adjustment of all labor disputes in shipyards throughout the country.

The agreement calls for the creation of an adjustment commission consisting of three, four or five members, according to the nature of the problem to be solved. The President has designated E. Everit Macy of New York as chairman of the Commission. Samuel Gompers, President of the American Federation of Labor, will name the second member of the commission, and the Emergency Fleet Corporation will designate the third. Where Navy work is at all concerned, F. D. Roosevelt, Assitant Secretary of the Navy, will serve on the Board. Where trouble on a large scale is threatened in private shipyards, a representative of local labor and of local shipping interests will sit as members of the commission with full voting powers. In the event of a tie vote, when Assistant Secretary of the Navy Roosevelt's presence raises the membership to four, the deciding vote will be cast by the Secretary of War, Chairman of the Council of National Defense.

The following signed the memorandum: F. D. Roosevelt, Acting Secretary of the Navy; Edward M. Hurley, Chairman U. S. Shipping Board; W. L. Capps, General Manager, Emergency Fleet Corporation; James O'Connell, President Metal Trades Department, A. F. of L.; William H. Johnston, President International Association of Machinists; A. J. Berres, Secretary-Treasurer, Metal Trades Department, A. F. of L.; Samuel Gompers, President of the American Federation of Labor; Joseph F. Valentin, President International Molders' Union; Theobold M. Guerin, representing the United Brotherhood of Carpenters and Joiners; John M. Donlin, President Building Trades Department, A. F. of L.; John R. Alpine, President United Association of Plumbers and Steam Fitters; Milton Snellings, President, International Union of Steam Operating Engineers; Joseph A. Franklin, President International Brotherhood of Boiler Makers and Iron Shipbuilders; James Wilson, President, Pattern Makers' League of America, and J. W. Kline, President of the International Brotherhood of Blacksmiths and Helpers of America.

Labor in Shipbuilding Construction

ONE of the errors that has been presented to the Shipping Board at Washington in respect to shipbuilding possibilities in the North Pacific has been the assumption of a shortage of labor in this territory. Some builders in earlier months of the work did apprehend a shortage of labor. However, in the wood shipbuilding line the labor has been vastly more plentiful than the demand so far. If the government had made proper dispatch in preparing its plans and adapting those plans to practical conditions, there might be three or four thousand more men employed in the wood shipbuilding yards of the Columbia river than today, but the delays experienced have been such that the influx of labor has constantly been far ahead of the demand.

A large number of laborers at interior points have indicated their willingness to engage in shipbuilding construction on the Pacific seaboard, and it has been found that this could be accomplished without disarranging any vital industry of the interior. A sudden call for a large number of carpenters for cantonment construction at the military centers gathered around those points most of the available house carpenters. This cantonment work is mostly finished and thousands of carpenters engaged in this work are ready to take up shipbuilding construction. Labor conditions so far as the supply goes are regarded very satisfactory by all the local yards, and whatever assumption the Shipping Board indulged as to any shortage is largely erroneous.

All of the Columbia river wood shipbuilding yards have declared their fixed purpose of keeping their business on an open shop basis. Demands are being made by the unions to close the plants to non-union labor, but it is held by the construction men themselves that granting this demand would be one of the most serious concessions that could be made in the matter of delaying and slowing down production.

Most of the labor employed in the wood shipbuilding yards must be trained or adapted to the work. There are no classes of long-standing experience which could be held sufficient for the requirement. Entirely green hands have to be brought in on short notice and given intensive training for the work, and in such procedure as this the builders hold that the unions are always antagonistic. If the supply of men in all lines of construction were left to the ordinary rules of procedure in union organization, the labor problem would become fatal to the industry here so far as meeting urgent government requirements go.

Another consideration in the matter of closing the shop in wood ship construction is found in the fact that the producers of the raw material for the wood ships are all on open shop basis. As soon as shipyard workers were organized they refused to handle lumber manufactured on a 10-hour basis, or in open shop mills. The lumber bills of the Northwest, to the extent of about 98 per cent of the total, declare that they will never grant an 8-hour day and will never go on a closed shop basis until the lumber districts in all of the competitive territory do likewise. The argument of the mill men is that they today pay common labor 50 per cent above the price paid by the yellow pine manufacturer of the South and the yellow pine territory works from ten to eleven hours on the less wage. If the pay in the Northwest mills as prevailing today was continued on an 8-hour basis, the mill operators declare a further 20 per cent increase on their actual labor costs would be enforced. This would have the immediate effect of driving the Pacific Coast lumber out of certain competitive territory that is now legitimately held, and which the mill men say they cannot surrender without disaster to their industry.

Activities at Our Northern Port

Marking the advent of still another steel shipbuilding plant into the ranks of the actual producers, the "War Leopard," a fine freighter of 8800 tons deadweight, slid down the ways of the new plant of J. F. Duthie & Co. at Seattle. The "War Leopard" is 410 feet 6 inches between perpendiculars, 54 feet moulded beam, and 34 feet moulded depth. She will be turbine driven and of about 11½ knots speed. The vessel was purchased after being started by the Cunard Line and in turn passed to the ownership of the United States Government, several weeks ago, when she was commandeered. The ship was delayed on the ways for a long period on account of the inability of the steel mills to fill orders, but work progressed rapidly when the shortage was overcome. The Commercial Boiler Works of Seattle built the boilers for the "War Leopard."

Naturally, the first big launching at the Duthie plant was made quite a gala event. The ship was christened by Mrs. C. D. Bowles, wife of the President of the shipbuilding concern, and among those present at the ceremony were: Capt. John Whitehead and Capt. James Murdock, representatives of Lloyds; Edgar Ames, President, John Wilson, General Superintendent, and George W. Albin, Secretary, of the Ames Shipbuilding & Drydock Co.; C. D. Bowles, President, and J. F. Duthie, Vice-President and General Manager, of J. F. Duthie & Co.; Robert Bridges and Dr. E. C. Ewald of the Seattle Port Commission, and David J. Frazer of Balfour, Guthrie & Co.

The Marine Pipe and Machine Works is expanding its facilities to the fullest extent to meet the demand for marine machinery that has assumed gigantic proportions all along the Pacific Coast. The new plant which is being installed will be devoted practically exclusively to the manufacture of Sumner Diesel engines. Property was secured on Spokane Street and Railroad Avenue, Seattle, and a building 180 by 100 feet in size erected. This building is being equipped with the latest and most up-to-date tools and is served overhead by a 15-ton traveling electric crane. This well equipped shop will be devoted to the manufacture and erection of Sumner engines, and there is space for erection of six large units at one time. It is worthy of note that the Marine Pipe and Machine Works merely took up the building of the first Sumner engine as a side line, but the excellent results obtained have resulted in a demand that made a large special establishment for turning out this work alone necessary.

Names have been chosen for the 8800-ton steamers building by J. J. Coughlan & Sons at Vancouver for the British government as follows: No. 2, "War Champ"; No. 3, "War Charger"; No. 4, "War Chariot"; No. 5, "War Chief", and No. 6, "War Noble." Ship No. 1, which has now been delivered, was christened "War Dog."

The first merchant ship built in Seattle for a foreign government, the 2600-ton auxiliary-powered wooden schooner "Barleoux," was launched from the yards of the Puget Sound Bridge & Dredging Co. on August 18th, and was delivered to representatives of the French government on September 1st.

The Allen Shipbuilding Company, one of Seattle's latest wooden shipbuilding plants, is installing building-ways at its Salmon Bay site.

The motorship "Esperanca," the first vessel of a large size to be equipped with Winton Diesel engines, held a very successful trial trip on August 29th. Among those present were Mr. Alexander Winton, President of the Winton Engine Works, and Mr. Salisbury, Chief Engineer of the Marine Departmetn of the Winton works.

The motorship "Apex" was launched from the yards of the National Shipbuilding Company, Seattle, on August 27th. The "Apex" is 155 feet long, 36 feet beam, and 23 feet 5 inches depth, and has a deadweight capacity of about 1,100 tons. She will be equipped with a 350-horsepower Diesel engine and will be used in the southeastern Alaska trade of Wakefield & Co., for whom she was built.

The Standard Boiler Works of Seattle has purchased a site on the West Waterway and West

Launch of the "Rokkosan Maru" at the Skinner and Eddy Corporattion's plant, Seattle. The "Rokkosan Maru" is completing to the order of Mitsui and Company.

Hanford Street, Seattle, for the purpose of expanding their plant. The tremendous demand for marine boilers made enlargement imperative.

The steamer "Rosewood," built at the yards of the Pacific American Fisheries at Bellingham, Washington, was launched on August 27th. The "Rosewood" is 250 feet long and 42 feet beam.

The Federal Export Board is to establish offices at San Francisco, Portland and Seattle to expedite the clearance of vessels requiring export licenses. Mr. H. F. Sewell of the Bureau of Export Licenses came out from Washington, D. C., to establish these offices.

Mr. J. E. Wilson, assistant general passenger agent for the Admiral and Pacific Steamship Company lines, has resigned from this position in order to enter the freight forwarding business. Mr. Wilson's resignation takes effect at the end of the present month.

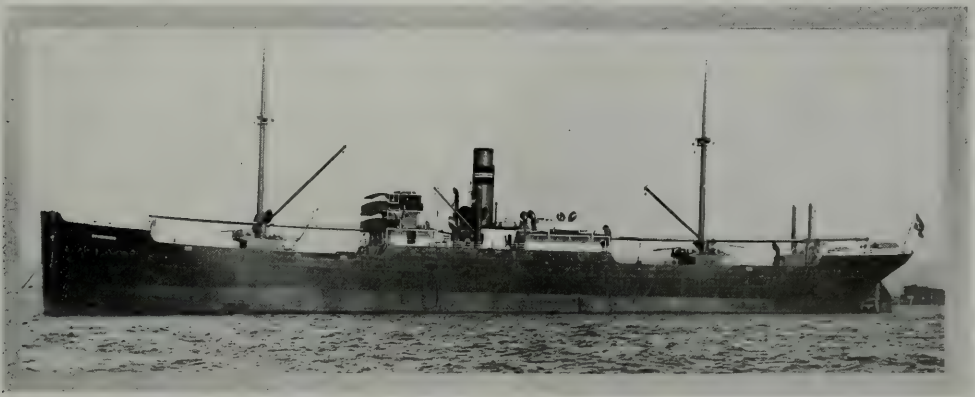
With the steamer "Senator" which sailed for Singapore on September 11, the "Umatilla" leaving Seattle for the Far East on November 15, and a large chartered freighter sailing on December 1, the Pacific Steamship Gompany has opened up a new American-Oriental line which promises sailings from Puget Sound every fifteen days. If the venture proves successful these boats will be kept permanently on the run.

The Hart-Wood Lumber Company has placed a contract for a 1,500,000 feet capacity lumber schooner with the Mathews shipyard of Hoquiam, Washington.

The Seattle Port Commission has fixed its 1918 budget at $200,904.61 which sum just takes care of the interest and bond redemption funds. Surplus earnings will be depended upon to take care of running expenses and the deficits on the Elliott Bay and Washington ferries.

The Skinner and Eddy Corporation, Seattle, launched the 8800-ton deadweight freighter "Nikkosan Maru" on September 15th.

President H. F. Alexander of the Pacific Steamship Company was a visitor at the traffic headquarters of the company in San Francisco recently. After a stay of several days he proceeded to Southern California where he inspected the new terminals of the company at Wilmington and San Diego. The docks now used by the Admiral Line steamships at these two places are owned by the cities of Los Angeles and San Diego respectively, and they include every modern convenience for passenger and freight traffic.



The steamer "Storviken" one of the latest products of the Seattle Construction and Dry Dock Company's plant.

In and About San Francisco

A LUNCHEON was held at the Palace Hotel San Francisco, recently, in honor of the charter members elect of the Seamen's Church Institute of San Francisco.

The Institute was founded about twenty-five years ago by the Missions to Seamen, England. In 1913 its administration passed into American hands and articles of incorporation are being filed for its permanent incorporation under the laws of California. The directors of the new corporation are Messrs. John Lawson, W. J. Dutton, W. N. Drown, C. C. Stevenson, Jr., Augustus Taylor, Warren D. Clark, Rt. Rev. Wm. Ford Nichols, Venerable J. A. Emery and Rev. Chas. P. Deems.

The principal speaker at the luncheon was Mr. Edmund L. Baylies of the law firm of Carter, Ledyard & Milburn of New York City. Mr. Baylies is president of the Seamen's Church Institute of New York and vice-president of the Seamen's Church Institute of America. Through his efforts $1,200,000 were raised to construct the largest Seamen's Institute in the world, which is now located at 25 South street, New York City.

Mr. John Lawson also spoke, dealing with the traditions of the Institute. The qualifications and responsibilities of the new members were outlined by Mr. W. J. Dutton.

Mr. Baylies said in part:

"I want to convert and convince every one of you of the cause for which I will speak—the sailor. I would have you join with me today in thanking the sailor, not as an instrument like the machine on a steamer which makes the vessel go, but as a man. He is an essential part of commerce in the field of transportation, for without him there could be no ships, and without ships very little commerce. His value to the nation is especially evident today for we depend upon him to transport our troops and their supplies to Europe. We have not yet failed to find crews to man our ships in spite of the danger which they must face and the sacrifice which their brothers have made. In view of these things all of us ought to appreciate the work that the sailor has done, and there rests an obligation on the general community, as well as the ship owner, to provide for his needs. The principal need is a home. Some few who regularly come to port are able to marry and have children, but the vast majority are wanderers without a home. With this in mind we undertook the work in New York and raised over a million dollars to put up a building which was essentially a home for seamen, a place where he can sleep and eat, have his goods protected and be assured of privacy. We had to do it on a large scale to make it pay, and now we have an institution the running expenses of which amount to more than $200,000 annually, which is met by the income from the building itself, for we have proven that the secret of the successful solution of the sailor problem is to treat him, by no means as a subject of charity, but rather as one who is willing and able to pay his way and to help provide means of securing what he desires for his daily life are placed at his disposal.

"It will interest you to know that I received my inspiration from a San Francisco man, Mr. D. O. Mills, at the opening of the first great Mills Hotel in New York City. The thought came to me, this is the thing we must do for our seamen. Following this example we have erected an institute, two-thirds of which, on the Mills Hotel plan, secures an income sufficient to maintain the whole building.

"The only money that we raised is to cover the cost of the Institutional work; this comes to us from all over the country.

"San Francisco, after the war, will be a great port. The people of this community can and ought to care for the sailor. Do not hesitate to do this on a large scale, so that safety, comfort and inspiration can be provided for those who man the ships of the growing merchant marine of the Pacific.

"We believe that there should be a chapel in order that the sailor may have an opportunity to worship and to symbolize the spontaneous enthusiasm which arises only from a religious ideal.

"We, in New York, look forward eagerly to the day when you will have, proportionately, as great an Institute, or a greater one, than ours."

Among those present at the luncheon were: Messrs. B. D. Adamson, F. B. Anderson, J. K. Armsby, F. H. Beaver, R. I. Bentley, Thomas C. Berry, A. F. L. Comyn, C. W. Cook, R. F. Coyle, W. H. Crocker, J. O. Davenport, A. J. Dibblee, C. E. Green, Millen Griffith, B. L. Hodghead, Geo. W. Merritt, C. F. Mills, L. F. Monteagle, Almer Newhall, W. R. Porter, A. C. Ross, R. M. Tobin, R. V. Watt and the Reverends F. W. Clampett, W. K. Guthrie and E. L. Parsons.

PACIFIC COAST SHIPBUILDING COMPANY

The latest steel shipbuilding establishment for San Francisco Bay will be the Pacific Coast Shipbuilding Company, whose plant will be located on the shores of Suisun Bay at Bay Point. The site includes 271 acres with a waterfrontage of 2800 feet. Four building-ways will be installed and a complete outfit of shops. A great repair establishment will be worked up in conjunction with the shipbuilding end of the business, and this will probably mean a large drydock. It is the intention of the plant to start work on 9400-ton ships for the Government at the earliest practical moment.

The new concern has been authorized by the State of California to issue $3,000,000 in bonds, a large percentage of which has already been subscribed for. It is understood that work is already in sight for a period of several years and that the new plant will be worked up to its full contemplated capacity as quickly as the conditions of the labor and material markets will permit.

An interesting feature of the entry of the Pacific Coast Shipbuilding Company into the Western shipbuilding field is the return of the Scotts to their former business endeavors. Steel shipbuilding on the Pacific Coast had its genesis in the daring venture of Irving M. and Henry T. Scott in turning the old Union Iron Works from a famous plant for the production of mining machinery into what soon became a famous plant for the construction of steel vessels. Irving M. Scott, now deceased, was an engineer of ability and foresight. Henry T. Scott devoted his energies to the financial and business end of the business, and between these two forces a great industrial establishment was built up.

After the sale of the old Union Iron Works and the elimination of the Scotts and their associates from its management, Henry T. Scott and John T. Scott, his nephew, became interetsed with the Moores in forming the Moore & Scott Iron Works, but in this concern the Scott interests were in the minority. Several months ago the Moores purchased the interests of the Scotts in the Moore & Scott Iron Works, and at the same time took into partnership Mr. Andrew Moore, who became President of the company under the new organization.

In the new shipyard on Suisun Bay, Mr. Henry T. Scott will be President, the position he formerly held with the old Union Iron Works, and Mr. John T. Scott will be general superintendent, which is getting back into harness in the same capacity as formerly for him also.

Among the other well known men interested in the new shipbuilding venture are H. C. Breeden, a San Francisco capitalist; Alden Anderson, capitalist, and James Irvine, an electric power and railway director.

The site of the new plant is served by three railways, the Southern Pacific, Santa Fe, and Oakland, Antioch & Eastern. There are also three pipe lines adjacent to the property, those of the Associated, Standard, and Shell oil companies.

John T. Scott, general superintendent of the new Pacific Coast Shipbuilding Company, has returned from a tour of the North Pacific Coast during

Mr. Charles Dunann, one of the most widely known and highly respected passenger traffic managers on the Pacific Coast, who has just resigned his position with the Pacific Steamship Company.

which he studied shipbuilding plants with a view to making the yards to be construceed on Suisun Bay the most modern on the Coast.

He is enthusiastic over the outlook for thc $5,000,000 company in which he will continue the long shipbuilding career in which he has been identified with the Union Iron Works and the Moore & Scott Company.

Work on the Suisun Bay site is to be started at once and the construction of the plant which is to have a minimum capacity of 100,000 tons every three years, will be rushed.

It is expected that the shipyard will be ready for work on steel vessels by the first of the year.

According to Mr. Scott, there is ample room at the Pacific Coast Company's site for one of the most elaborate plants, and it has been determined that the 2800 foot deep water frontage can be materially increased as needed.

A big force of workmen will be required for the erection of the ways, machine shops, foundry and other buildings, and the construction of the slips and docks. The project involves the establishment of an industrial center which, in the opinion of Mr. Scott and others, is to become one of the largest in the West.

Immediately on the completion of the plant, it is announced, the Government stands ready to give the company orders that will keep it running at capacity for six years.

The Recruiting Service of the Shipping Board has enlisted the aid of the following advisory committee in the conduct of its work in San Francisco:

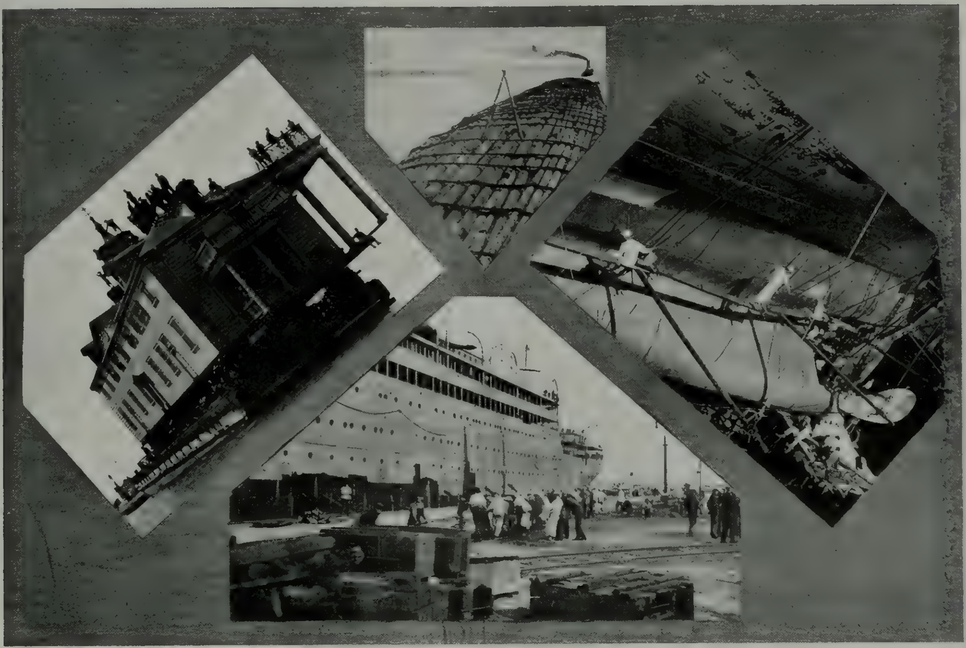
J. C. Rohlfs, Manager of the Marine Department of the Standard Oil Company, Chairman; G. L. Blair, of San Francisco & Portland Steamship Company; Capt. J. K. Bulger, U. S. Supervising Inspector of Steam Vessels; E. A. Chamberlin, of National Steamship Company; E. A. Christensen, of Sudden and Christensen Line; J. V. C. Comfort, of Pacific Mail Steamship Company; Leslie Comyn, of Comyn, Mackall & Co.; C .W. Cook, of American-Hawaiian Steamship Company; Hon. John C. Davis, Collector of Customs; Capt. Robert Dollar, of Dollar Steamship Company; Stanley Dollar, of Dollar Steamship Company; Capt. W. J. Gray, of Shipowners' & Merchants' Tug Boat Company; Capt. James Guthrie, U. S. Local Inspector of Hulls; J. R. Hanify, of J. R. Hanify Co., Chairman Maritime Committee of Chamber of Commerce; S. M. Hauptmann, of Chas. R. McCormick & Co.; Capt. C. F. Harriman, Asst. U. S. Inspector of Hulls; Dr. Ira Woods Hiwerth, Director of University Extension of the University of California; Prof. A. C. Leuschner, of Department of Astronomy and Dean of the Graduate School of the University of California; Oliver J. Olsen, President Association of Steam Schooner Owners; Fred D. Parr, of Parr-McCormick Steamship Line; R. C. Reed, of Balfour, Guthrie & Co.; Capt. J. N. Rinder; R. J. Ringwood, Vice-President Pacific Steamship Company; His Honor James Rolph, Jr., of Hind, Rolph & Co., Mayor of San Francisco; John H. Rossiter, of W. R. Grace & Co.; F. C. Samuels, of Oceanic Steamship Co.; Paul Scharrenberg, Editor Coast Seamen's Journal; R. H. Swayne, of Swayne & Hoyt; John H. Tennison, Assistant Secretary, Seamen's Union; James Tyson, of Charles Nelson Company; Dr. Benjamin Ide Wheeler, President University of California.

It is hoped that Judge Maurice T. Dooling of the United States Admiralty Court for this District, will also, upon recovering from the effects of his recent accident, consent to serve on the Committee.

On September 18, the first of a number of model barges building for the Crowley Launch and Tug Boat Company at their East Oakland yard, was launched. This barge is patterned after the latest Mississippi river developments and is much more pretentious than any similar craft yet in use on San Francisco Bay or the Californian rivers. The lighter is 125 by 38 by 12 feet moulded and has a deadweight capacity of about 900 tons. Elaborate quarters including state rooms, baths, showers, galley and mess rooms are provided at one end of the hull for a crew totalling thirty men. Sufficient boiler power is provided to run an electric light plant and also to charge the electric trucks which will be used for handling the cargo about the deck or from barge to wharf or levee and vice versa. A belt conveyor will also be provided with an extension long enough to reach to the top of any levee along the rivers.

The new passenger waiting room and freight office of the Pacific Steamship Company in the bulkhead building between Piers 16 and 18 on the San Francisco waterfront have been completed and are now being used. The freight offices are located in the space formerly given over to the waiting room in the southern end of the building and the new waiting room is located in the northern end. The rearrangement gives more room and additional convenience to the traveler and shipper.

The west shore of San Francisco Bay has never been seriously considered as a section in which to carry on shipbuilding owing to the fact that Hunter's Point marks the southern limit of deep water in-shore. However, the great demand for tonnage and the new yards springing up every day have upset all the former conservatism in reference to shipbuilding, and we find today that yards are being put in where the locations would not have been considered attractive several years ago. Following shortly on the heels of the yard for the



The Virginia building being towed away from the Panama Pacific International Exposition at San Francisco; a log raft towing on the Pacific Coast and two views of one of the German liners commandeered by this country undergoing an overhaul in dry dock.

construction of concrete hulls at Redwood City harbor, comes the announcement of the Schaw-Batcher Pipe Works, who are installing a plant at South San Francisco.

In the latter instance a canal will have to be provided and a basin in which to launch ships, as the works will be at a considerable distance from deep water. It is understood that the Schaw-Batcher people intend to side-launch their vessels. Dredgers and pile drivers are now busily at work on the preliminary channel work, bulkheading and filling.

The firm of Balfour, Guthrie & Co. have been appointed chartering agents for the Commonwealth of Australia.

Herewith will be found views depicting a wide variation of marine activity. The upper picture is of the S. S. "Amerika," formerly in the German trans-Atlantic service and interned since the opening of the war. The picture shows the big vessel being warped into dry dock "somewhere in the United States" where she is undergoing extensive repairs and a thorough overhaul preparatory to entering the service of the government, in all probability as a transport.

The picture below this shows another German liner being gotten ready for sea at an American navy yard. Aside from the damages inflicted by the German officers and crews of these vessels after it became apparent that the United States would be drawn into the conflict, the long term of idleness undergone by these ships made a thorough overhaul of both the hulls and engine rooms necessary before they could be utilized as transports, freighters or auxiliary naval vessels.

The third picture shows a great log raft under tow. These rafts have often been resorted to on the Pacific as a means of moving heavy timber shipments down the coast. The raft pictured herewith is 800 feet long, 52 feet wide and about 36 feet high, drawing 24 feet of water when at sea. The logs are from 80 to 100 feet long and run about four feet in diameter. The raft is held together by a system of chains, there being 64 chain bindings in the length of the structure. The amount of lumber thus transported is about 8,000,000 board feet.

The last picture shows another peculiar tow, the building shown on the barge being the Virginia building which was erected at the Panama-Pacific International Exposition at San Francisco. When the exposition was closed, several of the state and foreign buildings were moved away bodily to serve as club houses at country clubs, etc. The picture shows the Virginia building on its way across San Francisco Bay. The site of the exposition at San Francisco is now occupied by a camp of several thousand soldiers. The photos shown are by the International Film Service.

The Month in Tacoma

FIRST keels have been laid on vessels at the plant of the Tacoma Shipbuilding Company and work of getting material and vessels out is being rushed by the builders.

The Tacoma Shipbuilding Company is the last of the new wooden shipbuilding firms to begin active construction work here. It is understood that this firm has contracts for a number of vessels.

The plant is one of the most modern ones on the Coast. It occupies a site covering two blocks in the heart of the manufacturing district of Tacoma and faces directly on deep water at the south end of the harbor between the Milwaukee docks and St. Paul & Tacoma Lumber Co. docks.

The main buildings are composed of office, mould and mill buildings and blacksmith shop. The office building is 36 by 156 feet. A part of this is used for storeroom. The oakum shed is 28 by 48 feet and mill and mould loft 52 by 216 feet, while the blacksmith shop is 30 by 50 feet. The launching ways and building berths are practically 379 feet long and 64 feet wide. There is a crane way between the building berth 34 feet wide. The plant is equipped with the most modern machinery including cranes for different work about the yard.

The company has at its head representative Tacoma business men. H. A. Rhodes of Rhodes Brothers department store, is president; Arthur G. Pritchard, Fidelity Bank, treasurer; J. E. Bonnell, manager, and E. W. Heath, superintendent.

Under instruction of Prof. James E. Gould of the University of Washington, the first coaching school for the instruction of prospective deck officers was opened at Tacoma early in September. The school is being held in offices in the Federal building. This school covers the entire State of Washington. The school for engineers is at the University at Seattle. At the present time there are about 20 pupils enrolled here and the classes are growing. Enrollments are made every Monday morning. Capt. T. S. Burley, on account of the number of new applicants coming in, is assisting Professor Gould in his work.

On this voyage out from Tacoma the O. S. K. steamer "Panama Maru," one of the first vessels to be in the trans-Pacific service for this company, will be withdrawn and her place taken by the "Alps Maru," one of the new 8000-ton vessels put out for Osaka Shosen Kaisha.

The Danaher and Defiance mills, both to an extent working in the cargo trade, have met the demands of workers and are now running on an eight hour basis. These mills have also been supplying much of the material for local shipbuilders.

The St. Paul & Tacoma Lumber Co. is working a part force on ten hours basis and it is understood the Dempsey Lumber Company is also running a part crew on the long hour time.

Capt. H. H. Williams, master of the "Hilonian," formerly of the Matson line of steamers when that vessel was submarined out from Genoa last May, has accepted a position with the Foundation Company of Tacoma and has moved here with his family.

Admiral E. B. Rogers, auditor of the Pacific Steamship Company with headquarters at Tacoma and vice-president of the Commercial Dock, who was called to active service at the outbreak of the war, has been detached from the thirteenth naval district and is with the emergency fleet corporation board. Admiral Rogers, who was retired several years ago, is considered one of the most able men in the country when the operations of the financial end of the shipping business is considered. Admiral Rogers left for California about September 10 on business connected with his new duties.

Tea imports through this port, which is the examining station for Puget Sound, show very heavy business for this district for August. According to Examiner L. G. Fenton August imports amounted to 6,524,176 pounds. It is believed that September will be a record breaker in the amount of tea received here. Last September, the largest month in the history of the district, 7,000,000 pounds were received.

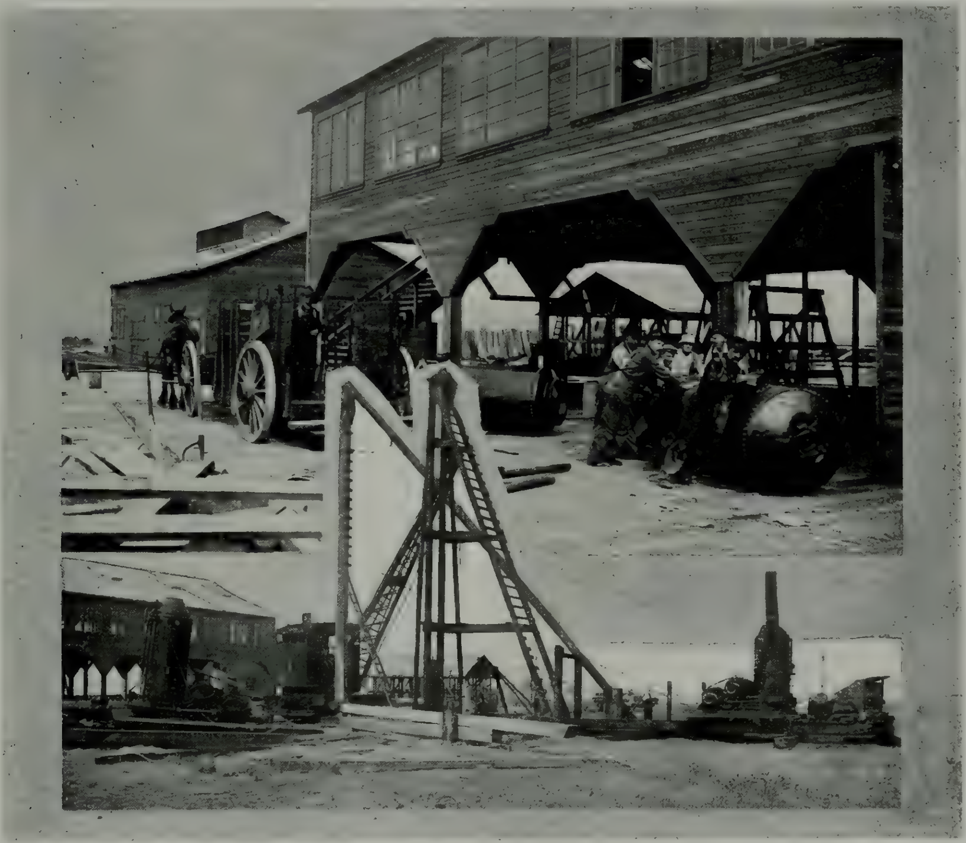
Active construction work at the Todd Drydock and Construction Corporations' Company plant was expected to be under full way before October 1, according to representatives of the company. The first steel for the plant began to arrive early in September while the drydock was practically completed by the middle of the month. There is much business now offering for the dock, the management declares. At the present time there are about 500 men employed. The working force is being gradually increased. The first vessel to be laid down is a 7500-ton ship.

At the plant of the Todd Drydock and Construction Corporation, the officers of the company are installed in their new quarters though maintaining at least for the present an uptown office in the Chamber of Commerce building. Sec.-Treas. C. S. Holmes and Assistant Manager J. A. Eves are among the many busy ones getting settled at the plant.

Because of a walk-out by about forty-five of the workers at the Wright Shipbuilding Company plant work was considerably delayed there for a few days, but in a way the strike came in opportunely as on account of lumber shortage at this time, it was almost necessary to lay a part of the force off. President Wright is not finding any difficulty in securing help, he states, and expects to get more as needed as work on the army post at Camp Lewis here is completed.

Charles Marks, former Bath, Me., shipbuilder, has accepted a position with Babare Brothers yards here. Mr .Marks, who is 76 years of age, is one of the old school of down east wooden builders. He came out here to see the Coast and visit friends with the result that he could not resist putting his hand to the wheel again and is now with the younger generation in the shipbuilding game.

Forming the fifth big wooden ship yard at Tacoma the Foundation Company of New York after considering different sites about the Sound and Gray's Harbor located at Tacoma. This company, which has yards at Vancouver, B. C.; Portland, Ore., and at Raymond, has the contracts for a number of vessels for the French and United States governments. Twenty wooden vessels will be constructed here. Work has already started on the plant. Twelve launching ways will be constructed. A. I. Campbell, Pacific Coast representative of the company, is in Tacoma looking after the first construction work. The work of securing this company is due largely to the interest taken by Gen. James M. Ashton, owner of the property the company is located upon and the Tacoma Dredging Company, which promised to fill some 97 acres for the firm within a certain time.



A corner of the mill and mold loft building and the material handling derrick at the plant of the Tacoma Shipbuilding Company, Tacoma, Washington.

For the purpose of looking over the business of the company, President H. F. Alexander of the Pacific Steamship Company was in San Francisco and other California ports during the early part of September. This company will enter the Oriental trade and despatch the first vessel about November 1 to Japan, China and Manila.

The Columbia River District

EXPERIENCE gained in the Portland nautical school, wherein about twenty students are enrolled, while fully fifty applied and have not followed up their applications, has impressed members of an advisory committee, which is made up of prominent Portlanders, that one of the principal drawbacks is the exaction that at least two years' sea experience is necessary before a man can be admitted to the classes.

At a meeting held September 11th with W. L. Gambs, of Seattle, in charge of the Northwest schools for the Shipping Board, it was made plain that unless some modification was authorized in that restriction it could not be hoped to maintain large classes. One solution suggested was to admit youhts of proper education and physical makeup, and, after training them for a certain period, give cruising experience and issue licenses as third and fourth officers, and in the event that they did not pass a reasonable examination following the cruise, give them a few months more at sea. It has been found there are a number of men ashore who have had some experience on deep water, but two years is more than most of them have enjoyed, yet in a general way they are capable of attending to ordinary ship's duties, or in a few instances men have served years ago and are not acquainted with a "day's work" aboard modern steamers of today.

Resolutions were adopted and forwarded to Henry Howard, in charge of recruiting for the Shipping Board at Boston, in which the modifications were urged, also that men having had experience in the Coast Guard and lifesaving service should be credited with at least three-fourths of the two-year period of sea service, and it is believed that additional men could be drawn in from those branches.

Chamber of Commerce officers are interested in arranging a short cruise for the students, and provision may be made for using one of the lighthouse tenders during a week-end in October.

Two keels of wooden steamers were down at the yard of the Coast Shipbuilding Company by September 10th, the officials of that concern having abided their time until immense wooden sheds were finished before laying the long timbers, and the rapidity with which frames went into place afterward satisfied them that they had acted wisely. They feel that they are prepared to carry on winter work uninterruptedly and as rapidly as possible a large force is completing two more sheds.

In many respects the Coast yard is among the most complete in the three states, as far as wooden construction is concerned. The location of saw sheds and shops is so as to make them most convenient, and installation for moving heavy timbers, even to the use of an overhead track in the sheds over the ways, paves the way for speedy handling once the force is operating to the maximum.

One event during September was the departure of the auxiliary schooner "Guanacaste," built by the Columbia Engineering Works for M. T. Snyder of New Orleans. She is equipped with Craig engines, and as the run to Astoria was made in ten hours, without turning them to the normal number of revolutions expected, her performance was regarded most satisfactory. What appealed to those aboard was the readiness with which they are stopped and started or reversed.

The "Guanacaste," which, by the way, was first erroneously named "Jauna Costa" and the official lettering so carried out, proceeded from Portland to Seattle to load lumber for Panama. On reaching the Atlantic side she will be delivered to the Costa Rica & Manganese Mining Company, of Delaware, which has taken her over from Mr. Snyder, as well as the "Tempate," now being made ready for sea, and the "Diree," which is next to be launched. The "Guanacaste" was not only the first of five ships Mr. Snyder contracted for, but was the initial effort of the Columbia Engineering Works. The fourth ship will be named the "Chiquilmula" and she will be fitted with Wolverine engines. Captain Alley, who has looked after construction details for Mr. Snyder, went out as skipper on the "Guanacaste" and on delivering her will return at once to Portland to direct the completion of the others. The "Tempate" is to be sailed on her maiden voyage and the engines are to be installed sometime later at Philadelphia.

Somewhat complicated has been the steel ship situation here in many respects since the issuance of an order by the United States Shipping Board to requisition all vessels under way. It was taken for granted in most quarters that the Government would not disturb tonnage building for the British government and generally referred to as Cunard ships. However, the steamer "War Viceroy," which got away the last of the month from the plant of the Willamette Iron & Steel Works for Seattle, was taken over by the Shipping Board about two weeks before her completion. Capt. Bell and other officers had been sent to Portland from England about three months ago to assume charge of the vessel, they reporting in advance of her launching. They remained until about August 15, when they were ordered to San Francisco to take over the freighter "War Sword," at the Union Iron Works. About a week before the "War Viceroy" was decreed to be ready, Captain Roberts and deck and engine-room officers, also in the employ of the Cunard fleet, arrived from Liverpool and fully expected to have the ship. The presumption has been that because of the close allegiance of the Allies no steamers being built for British and French account would be taken over by America as they are to serve the same purpose on the Atlantic in transporting materials.

Negotiations were closed early in the month by the Columbia River Shipbuilding Corporation through which it gained a lease on seven acres of land immediately adjoining its plant on the south, where it is proposed primarily to establish additional yard facilities, though the face of the property has sufficient river frontage for two or three more ways. Occupying a strip along the river is the plant of the Portland Shipbuilding Company, which devotes its attention to river vessels, and it has been planned by the Columbia River interests to take that over, in which event several more ways could be built. In accomplishing that, the Portland Shipbuilding Company's plant would be shifted further upstream.

The Columbia River Shipbuilding Corporation fully expects to have its first 8800-ton carrier in the water October 15th. The second is to be launched November 15th and the third in less than a month thereafter, by which time the force of more than 1400 men will have attained their stride and launchings will be in regular order. As the corporation will install all machinery there as well as complete hulls, it will be a decidedly busy institution.

As a result of a "heart to heart" talk enjoyed the night of September 10th between C. L. Ackerson, Naval Constructor of the U. S. Shipping Board Emergency Fleet Corporation, and representatives of shipbuilding corporations along the river, it is felt many kinks were ironed out relative to construction details as Uncle Sam sees them.

Mr. Ackerson is credited with being close to Admiral Capps, Manager of the Emergency Fleet Corporation; had much experience under him in Navy work and came West with well established ideas of just what his chief expects in turning out emergency carriers. With him was Captain John F. Blaine, of Seattle, District Officer for the Emergency Fleet Corporation, and Lloyd J. Wentworth, of Portland, who has represented the Corporation for a lengthy period, attended as well.

The gathering was under the auspices of the Columbia River Shipbuilders' Association, so the public was not on hand. It is said innumerable questions, which the builders have been unable to settle between themselves, were discussed with Mr. Ackerson, and they are hopeful the meeting will result in smoothing many features that they felt might obstruct the work at times.

Incidentally, it is said one of the problems Mr. Ackerson is to wrestle with is that of having a naval architect located on the Pacific Coast, so when questions or minor importance arise they can be disposed of without delays attendant on referring such matters to Washington, and even on to New York at times. The objection now is

Four wooden steamers under way at the Supple and Ballin plant, Portland, Oregon. These vessels are built on the Ballin steel topsides principle and are extremely staunch and well fastened craft.

The schooners "Tacoma" and "Portland" at the fitting out wharf of the McEachern Shipbuilding plant, Astoria, Oregon.

to having so many details sent back to the headquarters for official approval or disapproval that a man in authority on the Coast could as well dispose of without loss of time.

To attract to Portland representatives of every wooden shipbuilding plant on the Pacific Coast is the ambition of directors of the Chamber of Commerce, who are concerned in a propaganda in behalf of the future of the wooden ship industry.

In fact, authorization has been given by the directorate of the Chamber of Commerce for calling a convention, and, in advance of dates being fixed, W. D. B. Dodson, executive secretary of the body, will take the matter up with builders in the three states to ascertain the time that will probably be most agreeable.

Captain Ahman of the turbiner "Great Northern." This picture was taken just after the captain had spent twenty-four hours on the bridge during a heavy fog.

Primarily the move is to safeguard the industry from any unfair campaign against wooden vessels, but as well to band the Pacific Coast builders so all Government requirements may be met and to pave the way for additional business after the war. The wooden steamer and auxiliary schooners are not looked on as simply "war babies." Naturally, there are some who insist that the future merchantman must be either full powered or sailing vessels. Others pin their faith to the auxiliaries and point out that there will be greater development of that type in time.

In any event, the wooden carriers are expected to remain, just as have the older types of fore-and-afters before the rush of new business, and the campaign of backers of the proposed convention here is in the interest of the building industry. Also it is believed a substantial Coast association can do much at present to combat efforts made in the East by enemies of the wooden carriers to discredit them with the Government.

In Oregon alone there are 116 wooden ships under construction or contracted for. Most of the business had been placed with Willamette and Columbia River yards, though contracts have been awarded at Tillamook and on Coos Bay. It is the most extensive departure the state has undertaken and it is realized it must be protected. There are district organizations in existence now, such as the Columbia River Shipbuilders' Association, which includes in its membership steel ship builders as well as those having wooden yards, but the main purpose of those proposing a Portland convention is to have it devote its attention to wooden vessels and their future, realizing that steel construction will take care of itself.

Friday, September 14, the 8800-ton steel freighter "Landaas," originally contracted for on Norwegian account, was successfully launched at the plant of the Northwest Steel Company. The first steamer to take the water there, the "War Baron," unfortunately brought up against the river steamer "Ruth" and sank her, while the "War Viceroy," second of the group, struck a dock across the channel, doing nominal damage, so the "Landaas" carried out the old saw "the third is the charm" and was easily checked after being water borne and towed to the dock.

Mrs. A. O. Bjelland, wife of the Norwegian Vice-Consul, acted as official sponsor, christening the vessel with champagne in spite of Oregon being a "dry" region. The "Landaas" was ordered by John Erling, of Bergen, Norway, but is included with the vessels on the stocks requisitioned by tne United States Shipping Board, and was launched with the Stars and Stripes flying from the after jackstaff. She is 424.9 feet long, has a beam of 54 feet and depth of hold of 29.9 feet. Like her sister ships previously launched, the "Landaas" will be fitted with a turbine engine and is to make 10½ knots. Another of the type will be launched there in thirty days.

Portland's two members of the Alaska salmon fleet, the barks "Levi G. Burgess" and "Berlin," arrived home the second week in September, hailing from Nushagak, with 86,000 cases of salmon. The pack in 1916 by the same corporation, the Alaska Packers' Association, was 91,000 cases. It is said 10 per cent of the 1917 pack has been ordered reserved for the Government.

To serve as headquarters for the G. M. Standifer Construction Company, a modern building is being erected at Second and Columbia streets, Vancouver, Washington, where the company has laid out a plant with six ways, and half of them are occupied with keels of government vessels, of which ten were taken under contract. As the same interests are concerned in the Standifer-Clarkson yard, on North Portland harbor, the plan is to assemble vessels of both at Vancouver after launching, and there install the machinery.

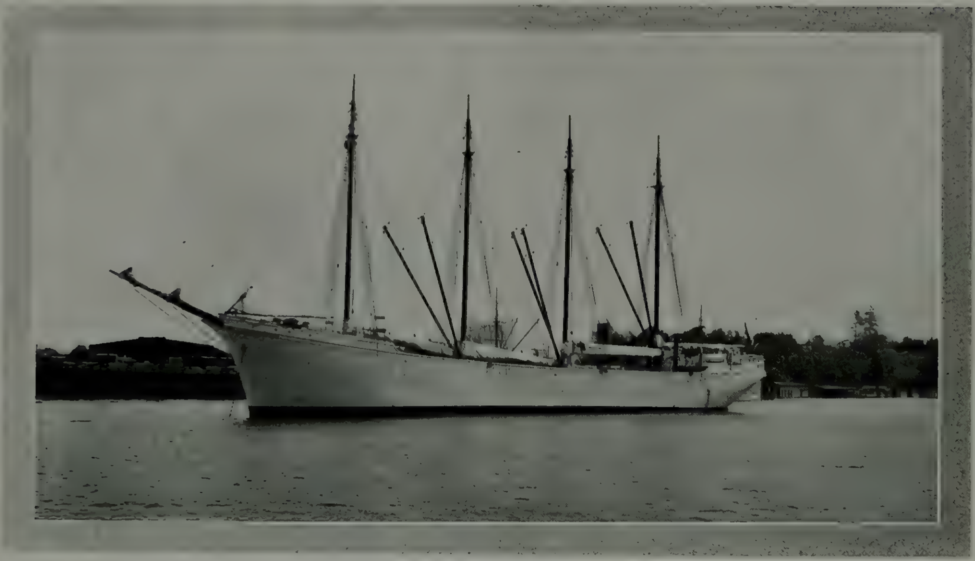
Illustrating the demand for ship knees from the Northwest was a shipment started September 13 from Airlie, Oregon, for Cornwell, Pennsylvania, of eight knees that moved by express. Each knee was said to weigh about a ton, and express charges were estimated at $1,000. Similar consignments had been made previously, but by freight.

Shipyard crane designed and built by the Colby Engineering Company of Portland, Oregon. This crane is typical of the material handling rigs used in the wooden shipyards of the Northwest.

It lacked only a month of being three years since she reached the river and was laid up that the American bark "Gamecock" finished loading a lumber cargo at Wauna for Australia. When she arrived in the Columbia river, October 11, 1914, she was the German bark "Arnoldus Vinnen" and hailed from Port Natal. She was taken over by the United States on the declaration of war, together with the "Kurt" and "Dalbek," the former being renamed the "Dreadnought" and the latter the "Red Jacket." Accommodations were provided aboard for eight apprentices and as many have been signed from among youthful timber in Portland.

For the next three months the pilot schooner "Joseph Pulitzer," originally built for the New York Harbor pilots, but which has served off the Columbia River for a number of years, will be

The "War Viceroy," the second contribution of the Northwest Steel Company of Portland, Oregon towards overcoming the great ship shortage.



The motorship "Astri" ready to leave the McEachern Shipyard, Astoria. This is a fine example of the western type of large wooden schooner-rigged vessel with internal combustion engines.

used by Dr. Andrew C. Smith, a widely known Portland Surgeon, in trading between Portland and Unalaska, she having been chartered from the Port of Portland Commission at a nominal price of $25 per month. The Commission has also indicated proposals for her purchase will be considered, as it is contemplated to provide a vessel of more power should the requirements of the pilotage service demand.

There was dispatched from Portland, September 16, the big Japanese tramp "Somedono Maru" laden with timbers for Japan. On a board-measure basis the cargo represented about 3,200,000 feet, nearly 1,000,000 less than her capacity. The smallest timbers were 18 inches in diameter and the largest 36 by 40 inches, most of the sticks being about 24 inches in diameter.

United States Inspectors of Steam Vessels Edwards and Wynn were notified early in the month by George Uhler, Supervising Inspector General, that changes had been authorized in rules and reulations governing the issuance of inland licenses, so inspectors were to use their own judgment and discretion in granting licenses, not being bound by the former exacting rules as to the time applicants must have served.

To have a steering engine installed, the lighthouse tender "Rose" was ordered here September 12. She had been on duty as a patrol vessel, and not much of her time has been devoted to lighthouse duties this season.

Capt. William H. Hobson, for years with the Oregon Railway & Navigation Company and Columbia Contract Company, died at Astoria, September 12, after an illness of ten months.

St. Johns Terminal is to be the name of the new 1,000,000-bushel grain elevator and water terminal facilities to be provided at St. Johns by the Commission of Public Docks. It has been determined as well to rename all docks operated by the Commission, they to be known hereafter as the Pittsburg-street terminal, Fifteenth-street terminal and East Washington-street terminal. The Commission disposed of $1,500,000 worth of bonds with which to start the grain elevator, September 6.

Bids are to be opened October 17 at the office of Colonel Zinn, Corps of Engineers, U. S. A., for the construction of a new hull for the wooden dredge "Champoeg," which the Government operates on the Cowlitz, Lewis and Clatskanie rivers.

On the strength of a report from San Francisco and Puget Sound tugboat concerns that they had not advanced wages as proposed by the Marine Engineers' Benevolent Association, the Port of Portland Commission has not granted increases on the tugboats "Oneonta" and "Wallula." The Association proposed a scale of $190 a month for chief engineers, instead of $150; for first assistant engineers, $145 instead of $110; and for second assistants $130 instead of $100.

To the turbiner "Northern Pacific," Captain Hunter, goes the record for the largest list of steerage passengers handled during September, 124 having left Flavel for San Francisco on that ship September 11. The "Great Northern" sailed two days later with 70, the rush being due to the number of men returning from Alaskan canneries.

In completing six Scotch marine boilers every month, the Willamette Iron & Steel Works is said to hold the record of the United States for a plant of the size. Besides building boilers for 8800-ton steamers under way here, the firm is building boilers for six smaller steamers for the Albina Engine & Machine Works, and has shipped boilers to Puget Sound and San Francisco builders.

Receipts at public docks here during August were $7115.47 as compared with $3789.91 in August, 1916.

One serious development during the month was the strike of wooden ship mechanics at Portland September 15, all but two yards being affected. The strike was preceded by the closing down of the McEachern Ship Company's plant and that of Wilson Brothers at Astoria, September 14, and at 10 o'clock the morning of September 15 the men at the yards in Portland district followed suit.

As a threatened strike of men in the steel plants, affiliated under the Metal Trades Council, was averted a short time previously and representatives of both employers and the men sent to Washington to meet with officials and labor leaders there to fix a new Coast scale and working conditions, it was fully expected the men in wooden yards would not drop their tools, but endeavor to obtain recognition from Washington as to their new scale.

Builders take the stand that the matter of increasing wages rests with the Shipping Board, while they are opposed to a strictly closed shop and, according to delegates of the unions, free access to the yards. There has been in general effect an eight-hour day.

The following list, issued by the Chamber of Commerce, shows the plants having Government and private contracts and the number of each, the only yards not drawn into the strike being the Coast Shipbuilding Company and Columbia River Engineeing Works:

GOVERNMENT WOOD HULL CONTRACTS

Kruse & Banks, North Bend, and Coos Bay Shipbuilding Co., Marshfield	10
Feeney & Bremer, Tillamook	1
McEachern Shipbuilding Co., Astoria	10
Wilson Bros., Astoria	4
Rogers Shipbuilding Co., Astoria	4
Sammarstrohm Bros., Columbia City	4
St. Helens Shipbuilding Co., St. Helens	4
Standifer & Clarkson, Vancouver and North Portland	10
Grant Smith, Porter, Guthrie Co., Portland	12
Peninsula Shipbuilding Co., Portland	4
Coast Shipbuilding Co., Portland	4
Supple & Ballin, Portland	8
	75

WOODEN VESSELS—PRIVATE CONTRACTS BEING FINISHED

Kruse & Banks, North Bend	4
McEachern Shipbuilding Co., Astoria	3
St. Helens Shipbuilding Co., St. Helens	3
Columbia Engineering Works, Linnton	4
Standifer & Clarkson, Portland	2
Peninsula Shipbuilding Co., Portland	4
Supple & Ballin, Portland	2
Kiernan & Kern, Portland	1
	23

FRENCH CONTRACTS—WOODEN VESSELS

Foundation Co., Portland	20

STEEL CONTRACTS

Northwest Steel Co., Columbia River Shipbuilding Corporation and Willamette Iron & Steel Works (8800-ton):	
Building	15
Finished	2
Albina Engine & Machine Works:	
3800-ton	4
3300-ton	2
	23

FRENCH CONTRACTS—STEEL

Northwest Steel Co., Columbia River Shipbuilding Corporation and Willamette Iron & Steel Works.	8

(Have not yet received Government orders for steel ships. Figuring on 16.)

It is estimated that between 13,000 and 14,000 men are employed directly in the shipbuilding industry in the Portland district, that including workers in steel and wooden yards, and the number to go out on strike is placed at 2200.

Launch of the 8800-ton freighter "Landaas" at the plant of the Northwest Steel Company, Portland. The "Landaas" is the third vessel to slide from the ways of the Portland yard.

North of Puget Sound

A YEAR ago there was not a large ship being built in the Province of British Columbia and the industry did not represent an output of much more than $50,000. Today there are $27,000,000 worth of steel and wooden vessels under construction or contracted for.

While the shipbuilding industry of the province is by no means new—wooden ships were built here as far back as 1788—its firm establishment as one of the chief assets of the West Coast of Canada has taken place within the year. It is of course due to the ever-increasing demand for ocean tonnage.

It was at Nootka Sound that the first wooden ship was built in 1788, since when a number of small vessels have been constructed from time to time. With the growth of Vancouver and Victoria shipbuilding and repair yards were established and several steamers and sailing ships of medium dimensions produced.

A year ago, however, there was not a single large vessel either building or contracted for in British Columbia. The Aid to Shipping Act, passed by the Conservative Government early in 1916, drew attention to the facilities available for shipbuilding, and soon afterwards contracts were placed for the construction of ten auxiliary-power wooden schooners .

This particular type of vessel costs about $150,000 and is similar to the motor sail ships that have been built in the Pacific States. They are 225 feet long, 44 feet in beam and 32 feet deep. Bolinder engines of 160 h.p. drive twin screws.

In order to assist communication between Eastern and Western Canada through the Panama Canal the Dominion Government decided to establish a line of vessels and have already let contracts for two ships of the auxiliary schooner type.

This started the activity, and contracts amounting to $18,000,000 had been let up to a few weeks ago. Since then announcement has been made by the Imperial Munitions Board of the letting of contracts for a further twenty-seven wooden steamers in this province.

The total programme of construction now amounts to $27,000,000 in value.

Of the original ten auxiliary schooners, six were to be built at the Wallace Shipyards at North Vancouver and four at the Cameron-Genoa yards at Victoria. Also, at the Wallace yards there were to be built three steel steamers of the "War Dog" type, one of which has already been launched.

These steel ships cost about $650,000 apiece.

At the Coughlan Shipyards at Vancouver a programme of construction involving $7,500,000 was embarked upon. It provided for the building of six steel steamers, one for Norwegian and five for British interests. They cost $1,250,000 each. Three are now under construction.

Meanwhile the Cameron-Genoa yards secured further contracts, and at the present time have built or are building ten auxiliary schooners.

Yarrows, Limited, at Esquimault, one of the oldest of the shipyards in this province, had secured contracts for four steel shallow-draught steamers for river navigation in India.

These were the principal of the older yards; but new firms sprang up and other shipyards were established. Harrison & Lamond, of South Vancouver, are building one auxiliary-power schooner, the British Pacific Engineering Company of Vancouver have a construction programme of $1,500,000, and the Vancouver Shipyards are building cannery tenders and other small boats.

This was the original programme of construction up to the latest announcement by the Imperial Munitions Board which added another nine million dollars to the value of ship contracts in the province.

The Lyall Construction Company of Montreal then secured a controlling interest in one of the Wallace shipyards and will build six steamers there.

For the purpose of establishing shipyards near New Westminster, the B. C. Construction Co. and the Westminster Marine Railway Co. amalgamated as the B. C. Construction & Engineering Co. They will build four of the new programme of twenty-seven wooden steamers.

Then the Cameron-Genoa Shipyards at Victoria secured four contracts, and the Pacific Construction Co. was formed to take over an old shipyard at Coquitlam and build two steamers.

In Vancouver another new firm came into being in the Western Canada Shipyards, Ltd., which is an association of Armstrong-Morrison & Co., Grant, Smith & Macdonnell, Ltd., the Northern Construction Co., and Palmer Brothers. They will build six steamers and have already commenced two of them.

Other yards either now existing or projected, and which hope to secure contracts, are: The British Columbia Marine, Ltd., Vancouver; the Prince Rupert Drydock & Engineeing Co. of Prince Rupert; the Sound Construction Co. of Vancouver; the Taylor Engineering Works of Vancouver, the Victoria Machinery Depot of Victoria.

There are plans for other new firms also, and there is every indication of still further developments in the very near future. It seems probable that new yards will be organized to build ships for sale in the open market, instead of on contract.

H. F. Alexander, President of the Pacific Steamship Company.

Shipping Among Our Allies

British Shipping and Sacrifices

London, September 1, 1917.

JUDGING by reports that reach me some of our Allies think that the British shipowner is securing enormous gains privately out of his mercantile marine work. This is very far from being the truth. For example, no less than 97 per cent of our commercial fleet is now requisitioned by the State and, furthermore, every ocean-going voyage of British steamers is now directed by the government which has regard only to the question of how it can obtain essential imports from the nearest source and pays scanty attention to the interests of the shipowners and the exporter. Of course, it is only lately that so large a proportion of our commercial shipping has been commandeered. One does not deny that certain great shipping combines and firms here have made tremendous profits, but it has to be borne in mind that besides paying the ordinary income tax and super tax these concerns have to part with 60 per cent of their excess profits, comparing this year, say, with the average of the three years preceding the war. This is a very serious cut into things.

British Shipping Companies and Their Funds

The prominence given by the large investment of Elder Dempster & Company in the Pacific Phosphate Company's shares recently will have served a useful purpose if it helps to focus attention on certain unsatisfactory aspects of the present British shipping situation. As vessels are sunk their owners receive very large sums of money representing the immensely increased values of tonnage. Yet these sums cannot be applied to replacing the vessels lost because owners now are not allowed to build. In fact, no encouragement whatever is given to them by the government to earmark the money to be so employed when conditions permit. On the other hand, the State is spending very considerable sums of public money on building in this country and, it has been stated in Parliament, has also bought largely abroad. Clearly, there is something wrong here. There ought to be some means of employing in the most suitable way—in the building of ships—the money received from the government, the mutual clubs, and underwriters in respect to vessels sunk by the enemy before the public are called upon to provide out of taxation the means of finding new tonnage.

Need for Rebuilding Liner Fleets

Very little has been published respecting the progress made with the State program of mercantile construction, but the scheme is known to be confined to cargo ships. These are the ships for which admittedly there has so far been the most urgent demand. But, however many State cargo ships may now be in course of construction, the government cannot indefinitely postpone an announcement of its policy as regards the high-powered vessels. Sooner or later the need to replace the ships of this class which have been lost—nothing is yet being done in this way—will become insistent. The importance of the multitudinous services rendered to the country during the war by the high-powered vessels which enterprising owners have provided cannot be overrated, and it is imperative, for a number of reasons, that the liner fleets should be replenished. When there is some indication that owners will be allowed to build at the earliest possible moment there will be less inducement for them to look outside the shipping industry for opportunities for the permanent investment of capital which never was so urgently needed within the industry.

Hamburg-Amerika House

On behalf of the Peninsular and Oriental Steam Navigation Company, Henry Trollope (of the firm of Messrs. Trollope) bought Hamburg-Amerika House, Cockspur Street (in the West End of London) for $301,000 on July 31st. The property was offered by Debenham, Tewson and Chinnocks, by order of the Public Trustee, under the Trading with the Enemy Amendment Act, 1916. In opening the auction, J. Seagram Richardson, senior partner of the firm, stated that the German holders of the property had kept a complete record of every detail of their expenditure on the site, premises and equipment, and had had it printed and well bound. The building was erected in 1907, from designs of Arthur T. Bolton and Stock, Page and Stock, for the Hamburg-Amerika Steamship Company. The ground floor is of polished granite, with expensive bronze ornamentation, and has a frontage of 75 ft. 8 in. to Cockspur Street, a rear frontage to Warwick House Street, and a site of 6,000 square feet. Part of the ground floor is let to the Allan Line Steamship Company (Ltd.). The property is held under two leases for 81 years, from 1906, from the Ecclesiastical Commissioners and a parochial charity. The leases were granted to the Direction der Disconto-Gesellschaft, and have 70 years unexpired. The ground rents amount to $25,048.50 yearly. Part of the building is in the occupation of the Ministry of Munitions. It was announced that possession of parts of the ground floor and basement now occupied by the Allan Line Company might be obtained, subject to 12 months' notice and a payment of $2,500. Mr. Richardson said that the building was furnished throughout without regard to expense and that the large india-rubber mat which covered the ground floor cost $3,500. The first bid was $125,000, and $200,000 was quickly reached. Then more slowly the amount crept up to $250,000. The final bid, by Mr. Trollope, was received with hearty cheering when the name of the buyers was announced.

Sir Eric Geddes's Successor

While Sir Eric Geddes was Controller of the Navy he was responsible for fulfilling the shipbuilding requirements of the Admiralty, War Office, and Ministry of Shipping, so far as possible, by manufacture or purchase, whether at home or abroad. Now that he is First Lord of the Admiralty it is understood that Alan Anderson has been selected to carry out these highly important duties. Mr. Anderson has a wide knowledge of shipping from his long association with Anderson, Anderson and Company, ship and insurance brokers, who are joint managers of the Orient Steam Navigation Company, Ltd. As a director of the Midland Railway Company, he has a first-hand knowledge of another branch of the transport problem. Since last October he has been vice-chairman of the Wheat Commission. Mr. Anderson is a son of Dr. Elizabeth Garrett Anderson, was educated at Eton and Oxford, and is about forty years of age.

Shipbuilding in Enemy Countries

Until recently most of the stories about merchant shipbuilding activity in enemy countries were German, Herr Ballin and Herr Heineken alternately lending an influential hand in their circulation. Now, apparently, Austro-Hungarian magnates have been invited to give the idea a turn, for, according to information which has reached Rome, the shipyards of the dual monarchy "are busy building merchant ships, chiefly cargo boats averaging 8000 tons, with a speed of 11 knots." The Adria Company, which in pre-war days was a patron of the Clyde's (Scotland) industry, is said to have 15 vessels "in course of construction." No doubt it has at least that number of units on order; it is also practically certain that other Adriatic concerns have prepared to the same extent for after the war. Much the same is true of German shipowners. But, as a simple matter of fact, very little merchant shipbuilding is in progress in the Central Empires, and not much more is likely to be done while war conditions last. The reputed size and speed of the Austrian ships are interesting as an indication of what enemy shipowners believe to be the most desirable kind of cargo boat.

Other Shipbuilding Activies

A Japanese shipyard, I hear, has undertaken to build fourteen cargo boats, ranging between 9,000 and 12,000 tons each, for British shipowners, the estimated cost being a little over $25,000,000. The great development that is taking place in connection with the output of Australian and Canadian establishments, especially the latter, has been already mentioned, and now comes news about shipbuilding activities at Hong Kong and Shanghai, where yards which previously existed only for the repair of vessels are successfully engaged in construction on a fairly large scale. As regards American enterprise, I am informed that nearly $200,000,000 of new capital has been invested in shipowning, and many more times that amount in shipyards.

ON THE EAST COAST

The Valk & Murdoch Company of Charleston, S. C., has announced plans for building a sectional floating dry dock, capable of holding vessels up to 8000 tons, at its plant on the Cooper river. The company now does a shipbuilding and repair business, and has for some time been preparing to expand its construction activities on a large scale. The new floating dock, however, will be independent of all other projects, and is designed especially to take care of repair work on all large vessels in the South Atlantic and Canal trade.

The company has made the necessary application to the Secretary of War, through the army engineer, and it is believed that there will be no difficulty in obtaining permission for reforming the harbor lines slightly. Work will begin as soon as the Government's permission has been obtained and the dock will be completed within about six months.

The proposed floating dry dock will be capable of holding 8000-ton vessels. It will be 440 feet in length, with a beam of 100 feet.

The fine new freighter "El Almirante," built by the Newport News Shipbuilding & Drydock Co. for the New York-New Orleans run of the Morgan Line (the Southern Pacific steamers), recently went into commission, strengthening this important freight and passenger service. The new vessel is single screw and is driven by a triple-expansion engine with cylinders 24½, 41½ and 72 inches in diameter by 48 inches stroke.

The report of the American Shipbuilding Company for the fiscal year ending June 30, 1917, shows a balance of $2,318,540 applicable to the common stock, or $30.50 a share. The total income was $5,617,985, from which was deducted expenses and a reserve of $400,000 for excess profits tax, leaving a balance of $3,148,040 to be distributed. During the year the preferred stockholders received $532,000 and the surplus totaled $1,786,540.

Great Britain's Shipping Outlook

THE following article on the future of British shipping apeared in the Liverpool Journal of Commerce, and is interesting inasmuch as it suggests the trend of British thought toward the maritime problems which that country, as well as all the other maritime powers, will face with the cessation of hostilities:

The war has brought many changes to the shipping trade, and as with every other important industry its resources are now unreservedly at the disposal of the nation for the effective prosecution of the war. How far its services have been utilized to the best advantage is a point which has provoked considerable controversy; but that they have been of the utmost importance is obvious from the generous tributes recently paid to the Mercantile Marine by Sir Edward Carson and the First Sea Lord at the inception of King George's Fund for Sailors. Whether such recognition enjoys a more general acceptance, however, is somewhat doubtful, and the view that the shipping interests of this country have profited unduly at the expense of the nation is only too certain to be reinforced by recent events in Parliament. Nevertheless, whether it secures general recognition or not, one fact is clear and incontrovertible—that the British Mercantile Marine has proved its potency and power in war as in peace.

The benefits accruing from the energies of those who have toiled unremittingly and long to secure the supremacy of British commercial maritime power have so often been accepted by the nation as a matter of course that the present attitude of the country at large as to its indebtedness to the shipping industry is quite in keeping with tradition. In the halcyon days of peace the real significance of the interdependence of the Navy and the Mercantile Marine was apt to be overlooked, and sea power was regarded as a matter of naval strength alone. But if the war has done nothing else for the mercantile navy it has at least emphasised the fact that British dominion of the seas rests not alone on the power of the Navy, but depends in a large measure upon the possession of a large merchant fleet also; and the day has dawned when the Prime Minister himself has been compelled by force of circumstances to make his famous appeal for ships for victory.

The true position of the Mercantile Marine in relation to the life of the nation having been emphasised, the question arises as to what the future holds for the industry. At the present time the whole trade is organised on a war footing, and everything that is undertaken is subject to Government consent and control. That that control will continue to a greater or less extent for some time after peace is declared must be apparent to all: for it is certain that many of the conditions brought about by the war, which have necessitated strict State supervision, will not disappear immediately as a result of the signing of peace itself, and some considerable time may elapse before the overseas carrying trade is restored to the normal. Nevertheless, much as it may have been necessary for the Government to intervene and assume control over shipping during the war, it is certain that the interests of the industry and the nation demand that steps be taken for the early restoration of free and unfettered control into the hands of the shipping interests themselves. Although there is some evidence of a tendency nowadays to regard the present era of State administration of industry as one which will continue so far as the shipping trade is concerned, expectations of that kind are hardly likely to be realized. The problems arising out of overseas traffic in peace time are not such as readily admit of solution at the hands of a State-controlled organisation. As was so clearly demonstrated in the discussions at the last annual meeting of the Chamber of Shipping, British shipping has to operate in open competition with the mercantile fleets of the world, and it is to be hoped, therefore, that the measure of State control over shipping after the war will diminish until shipowners once again enjoy more or less unrestricted power to develop their undertakings to meet that competition.

What the future will bring in the nature of competition it is not easy to anticipate, and none can forecast with certainty the lines on which it will proceed. Prior to the war, the German and Norwegian fleets offered the most serious rivalry to British pre-eminence; but whence the keenest competition will come after the war is at present shrouded in uncertainty. What shipping resources will Germany hold at the conclusion of hostilities? A large portion of her mercantile marine has passed out of her control during the course of the war, and it is extremely unlikely that any of the vessels so lost will be restored. But until the terms of peace are finally settled and signed, it is impossible to frame any estimate as to the probable strength of German mercantile shipping. It is important to remember, however, that the shipbuilding resources of our principal enemy are both complete and powerful, and there can be little doubt that efforts will be made to restore the German mercantile navy to its former standard. The character of these efforts may be appreciated by a study of the comprehensive subsidy measure now before the Reichstag. What measure of energy will be applied to this purpose it is impossible to gauge; but, having once tasted the fruits of the possession of a large and powerful shipping trade, neither the German people nor the German shipping community are likely to rest content with a position outside the foremost rank of shipping nations.

With regard to Norway, the position is all the more peculiar. In proportion to its size, the Norwegian merchant marine has during the war suffered more grievous losses than has that of any other nation—which, having regard to the position it occupied among the mercantile fleets of the world, is saying a great deal. Norwegian shipowners have made very great efforts to replace lost tonnage, but so far these have not been wholly successful. In the past the Norwegians were very large purchasers of second-hand ships; but even second-hand ships in these days are scarce, and vessels which in the old days would have come on the market are profitably retained in service by their owners. This source of supply failing, and the usual European shipbuilding facilities not being available, large orders for ships were placed by Norwegians on the other side of the Atlantic; but, with the new regulations promulgated in America, even this avenue would seem now to be closed to them. It is, therefore, manifestly beyond the power of Norwegian yards to make losses good at the moment, and although efforts are being made to extend the shipbuilding industry of that country, it is difficult to see how Norway can hope to regain her former eminent position among the shipping nations of the world for some time to come.

But, on the other hand, if the war has brought adverse effects to some, it has also brought adventitious aid to others—Japan and the United States in particular having made considerable headway in accumulating merchant shipping; while the lesson as to the importance of merchant shipping to the life of a nation, which the war has emphasised, is being silently appreciated even in the most unexpected quarters. It will be interesting, for instance, to note what inquiries for new tonnage will be forthcoming after the war from those countries which hitherto have been content to depend upon foreign shipping for the carriage of their imports and exports; and there are indications that South America, in the future, may prove a promising customer both to the shipbuilders of this country and of the United States.

Apart from changes of a competitive character, however, there are other considerations which will have to be weighed in framing a policy of peace development. The war has disturbed all things, and international trade has been entirely dislocated. Further, it seems certain that its re-organisation will not follow on the old lines; the bases of international commerce will be re-established afresh and every section of the community must be prepared to face totally different conditions in the future. As far as shipping is concerned, the centres of trade have shifted to a greater degree than is generally appreciated, and while many of the old avenues of traffic will continue to absorb a great volume of tonnage, there are a number of localities which have made rapid progress and will be urgently calling for ships for the transport of their produce.

FINANCIAL AND CONSTRUCTIVE

The H. C. Peterson Company, Inc., of San Francisco, decided at the end of last month to increase its capital to $250,000. This step was taken in order to provide $150,000 for the building of some 550-ton barges and powerful launches for use in the rapidly expanding business of the firm. The new stock issue was taken up by the original stockholders. Mr. Joseph J. Tynan is president of the Peterson concern, W. Leslie Comyn, treasurer, and Harry Levinson, general manager.

Mr. H. W. Cole, of Bulwinkle, Humboldt county, California, has purchased the wreck of the former Pacific Coast Steamship Company's coasting steamer "Corona." The "Corona" was wrecked on the north jetty of Humboldt Bay on March 1, 1906, and gradually buried herself in the sand. The wreck came into the hands of C. P. Doe, who sold her to Bulwinkle, who in turn has contracted with H. W. Pittman, of San Francisco, to raise and float the remains of the old coasting steamer.

Earnings of the Gaston, Williams and Wigmore Company show a steady increase of late months. The June net income after deducting charges was $375,000, the July $400,000, and the August promises still better results. The net earnings for the first half-year are in excess of $1,850,000. This figure is exclusive of the earnings of European offices and steamship profits, so that a forecast of $4,500,000 net for the year is considered well within reason, or $15 net earnings per share.

The oil tanker "J. E. O'Niel" was launched from the Alameda plant of the Union Iron Works on August 30th. The "O'Niel" was built to the order of the Atlantic Refining Company and is of 11,000 tons deadweight capacity, being 450 feet long and 62 feet beam.

The Benicia Shipbuilding Corporation, of Benicia, California, is to build two standard wooden hulls of the Ferris type for the U. S. Shipping Board.

The Hesse-Martin Iron Works of Portland, Ore., as representatives of the General Ordnance Company of Denver, Colorado, in and for the States of Oregon and Washington, announce that they are prepared to quote on triple expansion engines up to 750 horse power in capacity, these engines being similar to those specified by the United States Shipping Board Emergency Fleet Corporation.

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Deferred Repairs and the Increase in Cost

WHENEVER vessel property is being operated at a profit it is the desire of owners to defer repairs of damage which does not affect her earning capacity or does not invalidate the policies of insurance until such time as the delay consequent on making the repairs will not inconvenience them, until say she is due for regular overhauling or until winter causes a cessation of the operation and the vessel is laid up for the season. It not infrequently happens that a steamer may suffer damage to the bottom plating through grounding whereby the plates may be dented, a damage clearly caused by a peril insured against and the repair of which will form a claim against the underwriters. But as the ability of the ship to carry dry and perishable cargo is not affected it is natural that the owners should desire to defer the repairs until such time as they may be compelled, either by classification requirements or the necessity of Government inspection, to have a complete overhaul.

At the present writing the iron workers on the Pacific Coast are in a condition of unrest and in the largest shipbuilding and repairing yard a strike is in progress for an increase of 50 per cent over the present wages paid, other plants on the Coast are similarly affected and there is a complete stoppage of all building and repair work. There is no doubt but that the workers will gain an increase in wages, possibly not to the extent that they are demanding, but still any increase will add to the cost of repairs.

If repairs of damage which occurred prior to such increase in wages are deferred, solely for the convenience and profit of the owners, until after the wages are increased should the underwriters pay on the basis of the increased cost or only what the repairs would have cost had they been made at the time the damage was done?

A policy of insurance is a contract of indemnity and the assured is supposed to collect from his underwriter the cost of repairs made necessary by an accident arising from a peril insured against but should the assured be allowed to operate for his own profit his damaged property until such time as it serves him to make repairs and then to collect from his underwriter any increase in cost that may have accrued through the delay. This question is now being considered by local underwriters and it is possible that some action may be taken, but whatever action, if any, is taken the assured should be notified that the liability of the underwriters will be limited to the amount the repairs would cost at the time survey was held and permission granted to continue in trade and that any increased cost which may be due to the delay will be at the expense of the assured.

Contributory Values of Steamers

IN the May issue of this journal I commented on the case of the steamer "San Onofre," which steamer was valued, for the purpose of awarding salvage, at the sum of approximately £370,000. This steamer was built some two years before the salvage service in question was rendered at a cost of about £163,000 and was at the time engaged under a time charter which had many years to run at a rate which paid a fairly good income on the cost price but which could not be considered a good income on the value fixed by the court. In that article I quoted several authorities all agreeing that the contributory value of property to general average expenses and sacrifices would be the value which the salved property, so far as the owners were concerned, had at the completion of the venture. It will be remembered the court held that the value of fixing the award for salvage

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37-43 WALL STREET NEW YORK
AND BRITISH COLUMBIA, 264 COLMAN BUILDING, SEATTLE, WASHINGTON

services should be the actual amount the vessel would sell for in the open market free of all incumbrances.

Another question has now cropped up in connection with another case and that is whether or not, in fixing a value for contributory purposes the tax on excess war profits should not be deducted from the amount for which the vessel would sell in the open market. Great Britain is now taxing war profits to the extent of 80 per cent and the question is should not that tax be deducted from the price which might be realized in the open market. Take the case of the "San Onofre." Her original cost was £163,000 which would represent her intrinsic value at that time. Writing off 10 per cent for depreciation for two years would make her intrinsic value at that time say £147,000. If then she would sell for £370,000 owing to the war conditions there would be a war profit of £223,000; 80 per cent of which would be say £178,000, leaving an amount of £45,000. This added to the book, or intrinsic value would leave an amount of £192,000 as representing the actual value of the ship to her owners.

This is not fanciful reasoning. Without the war conditions the steamer would not have been valued at any such sum as was taken by the court, and without the war conditions the owner would not be mulcted for any tax on whatever profit he might make on the deal. If the value to the owner of property is the true criterion for the fixing of contributory values, and all authorities agree on this, and if, owing to abnormal conditions, inflated prices must be taken into consideration, then also other things due also to the same abnormal conditions must be considered. This tax is assessed by reason of the same conditions that make for the high selling value of the property and the value of the property to the owner is less, by that amount, than the actual price obtained.

Marine Mishaps

"ADMIRAL WAINWRIGHT," Str.—From Seattle Sept. 15 for Nome, Alaska, went ashore during a dense fog on Marrowstone Point. She was later floated, apparently undamaged, and returned to Seattle for survey.

"BRITISH COLUMBIA," Br. Str.—While loading cargo at Hastings Mills, B. C., on Aug. 24, for Anyox, B. C., sunk at her dock without apparent reason. A contract for salving the steamer and cargo has been entered into for the sum of $37,750.

"CUZCO," Nor. Str.—Reported ashore at Salaverry, Peru, in February, 1917; has been floated and taken into a port for survey and repairs.

"IRMGARD," Schr.—From Manila July 22, for San Francisco, suffered extensive damage during a typhoon, was obliged to jettison the deck cargo and was towed into Keelung Aug. 27.

"JEFFERSON," Str.—From Seattle for ports in Southeastern Alaska, was in collision on Aug. 27 with the Br. Str. "Princess May." The "Jefferson" proceeded for Juneau, where all of the cargo was discharged and the steamer then returned to Seattle. Cost of repairs estimated at $10,000.

"SIERRA," M.S.—From San Francisco Aug. 16, with a cargo of lumber for Callao put into San Diego on Aug. 24 with a broken crank shaft. Repairs were made and the vessel has proceeded.

"ST. KATHERINE," Sp.—Before reported ashore at Ugashik, Alaska, in May last has been floated and is being towed to San Francisco for survey and repairs.

J. A. Moffett, Standard Oil tanker, slightly injured by a gas explosion in one of her forward tanks at Richmond, September 25. At the time the tank had been steamed out and was being cleaned.

Mr. George E. Monroe, Jr., one of the most popular among the younger merchant marine engineering officers, has been issued his chief engineer's license.

Mr. R. B. Hooper, of Johnson & Higgins, went to Seattle from the San Francisco office of that firm near the close of the present month. Mr. Hooper's stay in the Northwest will be indefinite.

Marine Superintendent Hewitt of the McCormick fleet is in Portland from his San Francisco headquarters looking after the installation of machinery in the "City of St. Helens," the third five-masted auxiliary schooner the McCormick interests have added to the Coast fleet. She is fitted with twin Bolinder engines, which were shipped from Sweden via New York and San Francisco.

Freight Report

By Page Brothers

San Francisco, September 19, 1917.

SINCE our last circular in August, very little has been done in chartering, especially on time charter. Vessels are scarce, the strikes have interfered, the uncertainty owing to Government restrictions on exports of certain commodities, and the fact that the British Admiralty has the power to prevent even neutral vessels from carrying out a charter, all tend to discourage chartering. Right at this moment a Norwegian steamer was ready to carry out a charter to the Orient, the charterers had a cargo duly licensed or permitted to be shipped, and the British Admiralty has prevented her from performing her charter.

The American steamer "Jeannette Skinner," now up North, built in this country and sold to Norwegians, evidently has not been permitted to proceed where her owners desired, as advices are that the United States will permit her to make a voyage between this coast and an American Atlantic port.

A letter just received from Europe referring to three motorships building on the Sound states: "These vessels are all unfixed, but Norwegian owners are now negotiating with the American authorities regarding transfer and license, and until these matters are cleared up nothing further can be done." Under these circumstances the drawbacks and uncertainties are great and discouraging to chartering.

Last month the steamer "Storviken" was chartered for a round trip to the Orient for a lump sum of $105,000 monthly on time charter, equal to $14.00 per ton per month deadweight. Vessels are scarce, however, and yesterday an agent told us he had just fixed a steamer for a similar trip equal to $17.00 per ton on deadweight; the name of the steamer was not divulged.

There are enquiries in the market from different sources asking for offers of tonnage to load wheat from Australia to this coast and to American Atlantic ports, but tonnage suitable for this purpose is not much in evidence. One wooden schooner is now on the way here, and a freight rate of 80/- is quoted for further shipments to this coast.

Lumber charters have been few especially, owing to strikes, Australia having taken one sailer at $36.00 Sydney, $39.00 Melbourne, per 1000 ft. and vessel chartered afterwards to load chrome ore from New Caledonia at $60.00 per ton to United States Atlantic port.

For West Coast direct port, three or four steam schooners have closed at $37.50 net per 1000 ft., but this rate was reduced by $1.00 by a motorship almost ready to load.

From the Orient to this Coast a good demand exists. The steamer just fixed for lump sum of $460,000. She is 8720 deadweight, October/November loading at Manila and one other port. This was for a voyage charter, not a time charter.

The "Santa Elena," the first of W. R. Grace & Co.'s wooden motorships, has proven herself highly successful.

"Santa Elena" Proves Highly Successful

A GREAT deal of interest is being centered in the four motorships that were ordered for the fleet of Messrs. W. R. Grace & Co. The first of these vessels, the M.S. "Santa Elena," is now in commission and has completed her first voyage to ports in Puget Sound.

The propelling machinery of the "Santa Elena" consists of two 320-b.hp. Bolinder fuel-oil engines of the latest "m-11" type fitted with air injection. The improved oiling system in use on this type of Bolinder engine has resulted in a considerable reduction of the consumption of lubricating oil. The engines are located in a large engine-room amidships, and the engine-room has a most pleasing and roomy appearance, the installation showing the results of the careful supervision of Mr. Magruder, Marine Superintendent for W. R. Grace & Co., who had complete charge of the lay-out of both vessel and machinery.

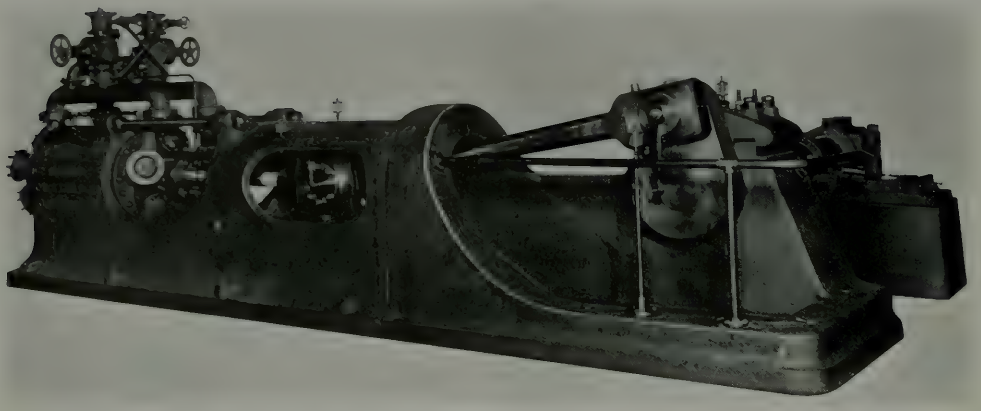
The auxiliary machinery consists of one 15-b.hp. Bolinder engine direct connected to one 10-kw. generator and one Baker rotary pump of 2500 gallons capacity per hour which is used for circulating water to various parts of the ship and as a general service pump; one 8-b.hp. Bolinder engine direct connected to a 5-kw. generator and one Baker rotary air-compressor. The refrigerating plant consists of one 1-ton Brunswick motor-driven ice machine, the ship being fitted with 600 cubic feet of refrigerating space for ship's stores.

In addition to the above machinery, all driven through power generated in Bolinder engines, there is an oil-fired donkey boiler, the burner system used being the Union Iron Works Dahl system. This boiler supplies steam for four double-cylinder, single-drum cargo winches and two emergency duplex steam pumps in the engine-room.

The "Santa Elena" was completed and made a preliminary trial run in San Francisco bay on September 10th, during which the machinery functioned satisfactorily and a speed of 9½ knots was obtained over the measured mile. On her first ocean voyage the vessel went to sea draw 19 feet 3 inches aft and with over 2000 tons of cargo on board, and found no difficulty in maintaining an 8-knot sea speed.

The main fuel-oil supply is carried in four steel tanks, just forward of the engine-room, with a total capacity of 1128 barrels, and these together with four steel tanks on the main deck in the way of the engine-room hatch and having a combined capacity of 392 barrels, and two 20-barrel day tanks in the engine-room, give a total fuel-oil capacity of 1570 barrels, or sufficient for seventy days' running. Fresh water is carried in two steel tanks right in the bows, there being tankage for 9700 gallons in additions to the service tanks located elsewhere. On the main deck, the donkey boiler, already mentioned, and the refrigerating compartments are located aft and forward of the engine-room hatch, respectively.

The hull of the ship was built by Matthews of Hoquiam, and the Bolinder engines were supplied through the well known firm of Henry Lund & Co., Pacific Coast agents for the Bolinder engine.



The Harris horizontal double-acting ice machine, an advanced type of scientific refrigerating machinery construction.

A NOVEL USE FOR ICE MACHINES

The Harris Ice Machine Works has just installed a complete refrigeration plant for the curing of whale meat at the whaling station on Grays Harbor, Washington, of the American Pacific Whaling Company of Victoria, B. C.

The food value of whale meat has long been recognized by whalers, Arctic explorers and others who, forced to try it through necessity, found that whale steak compared quite favorably with beef. It was not until recently, however, that attempts have been made in this country to introduce whale meat to the markets as a serious competitor of other food products. Heretofore the carcass of the whale, containing many tons of edible meat, has either been allowed to rot or else turned into fertilizer. The steady increase in the use of mechanical refrigeration has pointed the way in which this valuable meat can be placed in the markets of the world at prices within the reach of all.

The great cold-storage plant at Grays Harbor which will serve as one of the great distributing centers for whale meat on this coast, was designed and built under the personal supervision of Mr. Harris of the Ice Machine Company and is a model installation of its kind.

The Harris Ice Machine Works was founded at Portland, Oregon, in 1899 by Mr. Henry E. Harris, who started business with few tools and no capital, building the enterprise up to its present size through the excellence of the product turned out and through the continued policy of improving the design and adaptability of the machines.

Within the past eight or ten years a large demand has arisen for a small, simple machine suitable for the needs of butcher shops, creameries, etc., and about 1911 the Harris company began the development of a single-acting, vertical, enclosed-type compressor, which has since been brought to a high standard of efficiency. Interchangeability of parts and their manufacture from jigs and templates allow of speedy and accurate replacement of broken parts, and the simplicity of the compressor has resulted in its becoming a favorite machine with those who require a plant of small or medium capacity.

Larger installations have been taken care of by the Harris horizontal, double-acting machine, which is recognized as one of the finest examples of this type of ice machine design and construction as the machinery market affords.

RETURN OF A FAMOUS YACHT

The famous ocean-racing yacht "Anemone IV," which during the past eighteen years has been traveling the waters of the Seven Seas, will in the future have her home port in Port Townsend, E. A. Sims having recently purchased the big boat from her recent owners, the Portland Island Development Co., a British Columbia concern. The "Anemone IV,' was built eighteen years ago in Gosport, Eng., and home ported in Portsmouth. She was designed and constructed as an ocean racer by an English sportsman, and well fulfilled all requirements. She was afterwards owned by a California sportsman, and finally drifted to British Columbia. Several years ago auxiliary power, in the shape of a 125 h.p. Union engine was added, the power and necessary changes in the hull of the boat running to the pretty figure of $28,000. The "Anemone" is built of oak and teak, and it is claimed that her total cost has been $150,000. The yacht is 120 feet long, with a beam of 19 feet. She is fitted with a deep fin keel and ordinarily drew 14 feet of water. Over a hundred tons of ballast was taken out of her by her recent owners, so the boat now floats two feet higher. On a run up the Pacific Coast some time ago the "Anemone" repeatedly logged 14 knots, and with the big Union engine she consistently does 10 under power.

A Shipbuilder's Views on Concrete

A BOOKLET on the concrete ship recently issued by the Portland Cement Association of Chicago has brought forth considerable discussion among naval architects, marine engineers and shipping men and we reprint herewith a discussion of the problems involved by a former shipbuilder who has interested himself in the possibilities of concrete for marine construction. This shipbuilder's letter is as follows:

"I studied the booklet with the keenest interest, both because of my present interest in cement and my past experience in shipbuilding. The subject of concrete ships is a tremendous one, and I almost hesitate to express opinions, considering the very superficial study I have made of it. There remains to be done much pioneer technical investigation before the subject can be really understood by any one. I mention this simply to point out that there is always grave danger of the enthusiast delaying the progress of some idea of real merit through claims, perhaps not extravagant, but beyond any facts that the present engineering knowledge can back up. However, the vision must come before the actual work is realized and it is up to the enthusiast to push the vision. The builders of the 'Great Eastern' is an example of what I mean. This ship was built a little ahead of time, the details of marine engineering had not been developed sufficiently to handle the problem, and the ship after trial was pronounced a failure. Now, of course, ships are built compared with which the 'Great Eastern' was a pigmy. The designer's vision was all right but engineering knowledge was not equal to working out the vision at that time. The problem of concrete ships is essentially a great engineering problem and must be worked out carefully by the naval architect, and in the last analysis must succeed or fail according to engineering tests, regardless of public sentiment.

"My own present opinion is that there is a great field for the use of concrete in shipbuilding; how great a field can only be found out by our experience as we go along. The general advantage of concrete for this purpose are well brought out by the booklet, and I have nothing further to add. As to details of construction of the hull, there are practically two methods proposed, 1st, the erection of forms and the concrete poured in the usual manner; and 2nd, the erection of a steel frame work and the concrete applied to this to form the skin of the hull by various proposed methods.

"This first method means great expense for forms, and also certain difficulties in making the forms, especially at the extreme fore and aft parts of the hull where the cross section is constantly changing. To make such forms for one ship alone would seem to be out of the question on account of the expense. Hence these forms should be used as many times as possible to reduce the cost. This brings up the question of 'standardization' of ships. Many times in the past shipbuilders have wanted to build standard ships but were always brought up short by the fact that every ship owner wanted a ship somewhat different from the one owned by the other firm, which fact made standardization impossible. There is no reason whatever why the ordinary freight vessel should not be built according to standard designs, of any length, of course, that may be desired. With fast passenger boats the problem is more difficult, as rivalry and pride enter into the question and usually a very individualistic ship is called for. So it seems to me that the success of the 'form' method of construction depends absolutely upon how far ships can be standardized, and that this point

The shop of the Harris Ice Machine Company, Portland, Oregon, where a large business in refrigerating machinery has been developed.

should especially be emphasized. At the present time, of course, due to the war, when many ships are wanted quickly, more ships of exactly the same type will be built, and it is to be hoped that the lesson of efficiency and economy effected by this method will be learned and made a part of our future shipbuilding system. To sum up, I should say that the 'form' method is especially adaptable for freight vessels, because their cross section is the same for a great part of their length, and also because probably more 'freighters' of exactly the same type will be built.

"As to the second method of construction the hull (that of a steel frame over which the concrete is applied) this, of course, does away with the expense of forms, and I think adapts itself especially to the comparatively smaller types of boats such as motor boats and yachts. Boats of this class can hardly be standardized to any great extent and the elasticity of this method of construction allows easily the construction of hulls of various forms and sizes. It seems to me that the combination of the two methods could be used to advantage in the construction of ships of larger size, i.e., use forms for the middle body of the ship where the cross section is constant, and use the frame construction with plaster fore and aft where the cross sections are changing.

"I can see no special difficulty in constructing decks, bulkheads, together with the necessary stringers, beams and stanchions, of concrete if the whole work is so systematized that standard steel forms can be used. To attempt to use temporary wood frames, it seems to me would be fatal. A concrete deck would be less slippery than a steel deck, and where necessary, linoleum or wood could be fitted over. The superstructure of a ship, together with its deckhouses, could well be built of concrete and could be finished as to give a very pleasing appearance. However, such designs would have to be figured very closely as to weight. The concrete construction must weigh the same or less than steel construction or it will never be adopted. Every extra pound put into hull construction means so much less carrying capacity and so much more power necessary to drive the ship.

"The idea comes to me that if the hull of a ship be built of steel there is a good chance for concrete construction of the decks, bulkheads and deckhouses of such a steel hull. By getting the ship builders to introduce concrete in perhaps these minor ways, they will become accustomed to its use, see its advantages and it will be an entering wedge for a larger use of concrete.

"Naturally the use of concrete ships will come slowly unless the emergencies of the war will cause a quick development. The first field for concrete ships will hence be that of the simpler types of construction, such as river boats, ferry boats, canal barges, barges and harbor lighters. To get work started along these lines, it seems to me should be our first task. By so doing, fewer mistakes will be made, the ship builders will have a better chance to study the problem as they go along and the whole development of the subject will be normal and steady. Later the complex problem of the large sea-going concrete ship, subject to all manner of intense stresses due to rolling and pitching, will naturally come up for solution, and be solved through the experience obtained with the simpler type of concrete ship construction."

While thoroughly agreeing with the writer of this letter in his sentiments in reference to "going slow" with the concrete ship we cannot subscribe to his statement that ships are built nowadays alongside of which the "Great Eastern" would be like a pigmy.

SMOKE BOXES FOR PROTECTION OF SHIPS OBTAINABLE

(From Commerce Reports.)

The Bureau of Ordnance of the Navy Department is having manufactured by the Du Pont Co., smoke boxes suitable for use by merchant vessels as a means of escape from attacking submarines. Merchant vessels desiring to procure these smoke boxes can obtain them from the Du Pont Co. The cost will be approximately as follows: Smoke funnel, $125 each; phosphorus, $1.75 per pound; smoke boxes, $25 each.

The smoke funnel is for the production of smoke on board the vessel, and requires only the fuel for its continued use. The smoke boxes are for throwing overboard, and once used cannot be recovered.

The Navy Department is preparing to issue smoke boxes to all vessels carrying armed guards, and has announced as its policy that smoke-producing apparatus for the use of merchant vessels should be available for every vessel desiring to purchase same. It is urged that merchant vessels give prompt and favorable consideration to the desirableness of purchasing smoke-producing apparatus.

The War Instructions for Merchant Vessels of the United States, issued by the Navy Department, contains directions for the use of smoke-producing apparatus, and the Bureau of Ordnance of the Navy Department issues a pamphlet dealing with the particular type of smoke-producing apparatus manufactured by the Du Pont Co.

The Department of Commerce regards this matter as of great importance for the protection of our merchant vessels.

It is understood that the George F. Rodgers Shipbuilding Co. of Astoria, Oregon, will build four Ferris type wooden hulls.

Mainly About People

MR. J. B. MORRIS, chief engineer of the big turbiner "Great Northern," has been appointed as a U. S. Shipping Board machinery inspector with headquarters at Seattle. Mr. W. E. Russell will fill the berth vacated by Mr. Morris on the "Great Northern."

Mr. James C. H. Ferguson, who has been the local representative of the Wm. Cramp Ship and Engine Building Company, the American Engineering Company and other large Eastern concerns for years past, has been appointed Pacific Coast representative of Gaston, Williams and Wigmore, Inc., one of New York's largest and best known importing and exporting houses.

Mr. E. B. Egbert, formerly marine superintendent for the Robert Dollar Company, is now acting as traveling inspector for the U. S. Shipping Board with headquarters in Portland, Oregon.

Mr. W. J. Wardle, a prominent New Zealand shipowner, was a recent visitor to the Pacific Coast coming here to secure options on some motorships if possible.

Mr. J. S. O'Brien, assistant superintendent of construction in the U. S. Lighthouse Service, who has been stationed at Seattle and Long Beach for the past two years, has moved his headquarters to Portland, Oregon.

Mr. W. J. Grambs, assistant to the president of the Puget Sound Traction Light and Power Company of Seattle, has been appointed by the U. S. Shipping Board to the position of section chief of the sixth district of the free navigation schools established by the Government. The sixth district comprises Washington and Oregon.

Mr. Thomas Marshall, Assistant U. S. Inspector at Seattle, has resigned from the Government service to accept a berth as chief officer on an Atlantic liner.

Mr. Michael Halley, Treasurer and Purchasing Agent of the National Shipbuilding Company of Seattle, died on August 31st. Mr. Halley was known in many sections of the United States, as his business career was varied. He was Secretary of the Pullman Construction Company for fifteen years and was a member of the New York Stock Exchange, the Chicago Board of Trade, and the New Orleans Cotton Exchange.

"Bill" Chisholm, formerly marine superintendent of the Pacific Mail Steamship Company and later port engineer for the Southern Pacific ferry service, has been appointed to a position in the San Francisco office of the U. S. Shipping Board.

Another valuable employee of the Great Northern Steamship Company has entered the employ of the Shipping Board in the person of William M. Bunker, Chief Engineer of the turbiner "Northern Pacific." Mr. J. B. Morris, Chief Engineer of the Great Northern, has also been taken into the growing family of Shipping Board machinery inspectors. In speaking of the departure of Messrs. Morris and Bunker from his employ, Mr. W. F. Turner, Vice-President of the Great Northern Pacific Steamship Company, said: "While I am sorry to lose two men like Morris and Bunker, I feel that the Government has paid our service a high compliment." Mr. W. E. Russel, formerly first assistant, will now be the Chief Engineer of the "Great Northern," and R. S. Smith, formerly first assistant, advances to Chief Engineer of the "Northern Pacific."

Mr. W. M. Umbdenstock, Secretary of the Motorship Construction Company of Portland, Oregon, and Vancouver, Washington, was a visitor to San Francisco during a portion of the month just passed.

A. R. Gardner, head of the commissary department of the Pacific Steamship Company, has been making numerous trips up and down the coast with a view to seeing that the service is being kept up to the high standard set by his department. Mr. Gardner gave particular attention to the turbiners "Yale" and "Harvard," and he declared that the maximum efficiency had been obtained on these steamers.

Mr. Martin A. Neeland has been appointed president of the New York Shipbuilding Corporation to succeed Mr. Samuel Knox, who becomes the chairman of the board of directors.

Mr. William H. Ringe, Pacific Coast representative for the Shepard Crane and Hoist Company, left the Coast during the latter part of September to attend the annual convention of Shepard representatives at Montour Falls, New York.

Mr. R. E. Hilts, formerly district engineer at San Francisco for the Portland Cement Association whose headquarters are at Chicago, Illinois, has been elected by the Board of Directors of that body to succeed the late Mr. J. P. Beck as General Manager.

Capt. W. H. Varney, old time shipping man, is representing the Government as inspector at the Wright Shipbuilding Company and Seaborn Shipbuilding yards on Government work.

FOR SALE—Shipyard equipped with air-compressors and tools, band saws, planers, blacksmith-shop complete, wharf and 80-ton shear legs with two hoist engines, also spur track on to wharf. Address B. P. Lanteri, Pittsburg, Cal.

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KELLER PNEUMATIC TOOLS

SHIPPING AND SHIPBUILDING

The Tacoma Tug & Barge Company's tug "Fairfield," Capt. Vince Libo, has been engaged this summer in British Columbia towing. On account of the lumber workers strike towboat companies have been feeling the effects of no log towing and a number of the different Sound towing firms have laid their boats up. As several of the camp operators have signified their intention of starting up it is expected that within a few weeks the towing business will again be normal.

Capt. James Parse of Searsport, Me., has arrived at Tacoma and is superintending the fitting out of the new schooner "Betsy Ross," at the Seaborn yards. Capt. Parse is a well known New England coast mariner. He will take the "Ross" around to the Atlantic Coast.

Business with the Baker dock at Tacoma is very good, according to Sydney Baker of this company. Mr. Baker is representing the Nelson line of vessels here and any outside work that comes into Tacoma. Mr. Baker was formerly with the Eureka Dock Company when the old Pacific Coast Steamship Company, Matson and American-Hawaiian lines were in active service. When these companies closed their services here Mr. Baker took a section of the Balfour docks and went into the dock and storage business on his own account.

James Robertson, of the Benicia yards, was a recent Tacoma visitor and met a number of old friends here among whom was C. M. Seaborn. Mr. Robertson is taking in all the Northwest yards.

The Washington Shipbuilding Company, of Tacoma, has secured contracts for six steel vessels. The plant where these boats will be constructed will be located to the eastward of the Wright wooden shipyard at Tacoma. These six contracts with the fourteen on hand for the Todd plant makes a total of twenty steel vessels to be constructed at Tacoma.

Almost before the Pacific Marine Iron Works has gotten a start at its new plant it has been found necessary to erect a special building for blacksmith purposes. The blacksmith shop was housed with another department, but the rush of work has compelled expansion. The works is engaged in building Ballin water-tube boilers and large triple expansion engines.

COOKS WANTED

The United States Naval Reserve is very much in need of cooks, and can make use of 300 bakers, 200 butchers, and at least 1000 cooks. The age limits set are from 18 to 58, and aliens of friendly nations, provided they have first papers, may enroll. Full information can be given and enlistment received at any naval recruiting station, and the enlistment is for the period of the war only.

Commander C. R. Miller, of the U. S. N., speaking of the urgent needs of cooks, said: "The men of our Navy are the best fed body of men in the world. By comparison with the other navies, our bluejackets dine luxuriously—and just as well at sea as in port."

The Surgeon-General of the Navy, in his recent report, says: I can assure you that no navy in the world is as well fed, as well clothed, its general welfare so thoroughly looked out for as that of the United States.

Fresh meats and vegetables are served every day of the year in every clime and latitude. At sea or in port, the rations are about the same.

We teach men cooking at our training schools and they acquire an invaluable asset.

There is a fine opportunity for cooks, bakers and butchers, or for men to learn cooking. They may enroll for the duration of war or for the full four years if they desire. Any male citizen or aliens of friendly nations with first papers may come in. Ages 18 to 58 years.

Apply 280 Broadway, New York City, Room 90, or any Navy Recruiting Station in the United States.

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Tacks
Chain and Anchors
Cotton and Oakum
Files
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STEAMBOAT INSPECTION RULES

The Steamboat-Inspection Service has issued a circular letter, dated August 24, 1917, containing amendments of the general rules and regulations of the Board of Supervising Inspectors, and approval of vessel equipment and boilers, as adopted by the executive committee of the Board at a meeting held from August 15 to 22, inclusive, 1917.

The restrictions relating to tensile strength required for steel boiler plates as contained in amended rules were struck out of the rules and regulations by the following amendment:

Section 5 of Rule 1, General Rules and Regulations, all classes, reading as follows, was struck out:

"The tensile strength determined by the tests shall be not less than 58,000 pounds per square inch of scection nor more than 73,000 pounds per square inch of section, and the elongation measured in a gauge length of 8 inches shall be not less than 20 per cent."

And the following paragraph was substituted therefor: "All steel plates tested shall show an elongation of at least 20 per cent measured in a gauge length of 8 inches."

The following paragraph relating to determining the area of segment of boiler head was struck out:

"The area of the segment of a head to be stayed shall be that surface contained within a line drawn 3 inches from the inner circle of the head and 2 inches from the tubes or flues."

The following rule for determining the discharge capacity of a flat-seat safety valve was adopted:

"The discharge capacity of a flat-seat valve shall be one and four-tenths times that allowed for a bevel-seat valve."

Owing to the excessive demands for officers of merchant vessels created by the exigencies of the war, experience and examination requirements for license as master, mate, pilot and engineer of merchant vessels, as contained in sections 2, 21, 22, 23, 26, 31 and 32 of Rule V, General Rules and Regulations, both in Great Lakes and river rules, were struck out, and the issuance of licenses to officers of vessels within the classifications referred to was left by rule to the judgment and discretion of the local inspectors, as vested in them by law, the sufficiency of the experience of an applicant for license to be determined by the local inspectors when applicant applies for examination for license.

The following resolution approving dimensions of flanges made by the Bethlehem Steel Co. was adopted:

"Resolved, That the standard dimensions of cast-iron, composition and wrought-steel flanges as prepared and submitted to the committee by the Bethlehem Steel Co. for use by the shipbuilding plants of that company, be approved as meeting the requirements of the general rules and regulations relating to flanges. Copies of the blue prints covering drawings and dimensions as submitted to the committee must be furnished by the Bethlehem Steel Co. to each supervising inspector and each board of local inspectors of the district in which the plants of the company may be located."

The following-described vessel equipment was approved:

Childs fire extinguisher, presented by O. J. Childs, Utica, N. Y.

A B C life raft, presented by the Welin Marine Equipment Co., Long Island City, N. Y.

Universal ilanasilk, ring life buoy, presented by Robinson-Roders Co., Newark, N. J.

Universal ilanasilk, jacket life preserver, presented by Robinson-Roders Co., Newark, N. J.

Under the provisions of section 4429, R. S., the following-described pipe boilers were approved:

Emergency Fleet Corporation's standard water-tube boiler, presented by the Emergency Fleet Corporation, Washington, D. C.

Foster marine boiler, presented by the Power Specialty Co., New York, N. Y.

Meier boiler and Meier superheater, presented by the Heine Safety Boiler Co., Phoenixville, Pa.

RULES GOVERNING WAR ZONE SAILINGS

The following rules have been set forth by the Treasury Department for vessels traversing the submarine zone either to European or southern Mediterranean ports.

All vessels must be armed in accordance with the recommendation of the Navy Department or must furnish proof to the Bureau of War Risk Insurance that application has been made to the Navy Department for armament. The Bureau will charge an additional rate of one per cent on each voyage on vessels failing to comply with this requirement.

Each vessel shall be painted in accordance with one of the systems that are recommended by the chairman of the Naval Consulting Board. Full information relative to this painting will be furnished on application to the Bureau of War Risk Insurance, Treasury Department, Washington, D. C.

Each steamer when departing from the United States must carry a sufficient supply of approved smokeless fuel to carry her for two daylight periods, unless she is an oil burner or is supplied with approved apparatus for doing away with the visible smoke.

WANTED—A representative for ship chandler firm in Portland, Oregon. Excellent opportunity for right man. State wages desired. Apply Box 142, Pacific Marine Review, San Francisco, Cal.

All vessels must carry, when operating through the submarine zone, one dozen approved smoke boxes which will produce smoke when thrown overboard. Vessels must secure a certificate from the collector of customs that these smoke provisions have been complied with or else an extra premium of ½ per cent per voyage will be charged by the war risk bureau.

A NEW FACTOR IN MARINE WORK

It is generally accepted that old firms are apt to prove ultra conservative but in the metal trades as well as everywhere else it is the exceptions that prove the rule. A case in point is that of the Smith & Watson Iron Works, which was established at Portland, Oregon, in 1862, the present management being under the direction of Mr. A. F. Smith, president, and Mr. S. C. E. Smith, secretary.

The Smith & Watson Iron Works have been engaged for many years in the foundry and general machine manufacturing business, their principal output having consisted of a complete, well designed and well established line of logging engines, blocks and other logging equipment.

Main bay in the machine-shop of the Smith & Watson Iron Works, Portland, Oregon. This concern has been developing an extended line of marine auxiliary machinery.

With the establishment of the steel shipbuilding industry in Portland, during the latter half of the year 1916, the Smith & Watson Iron Works undertook the development of a line of ship machinery, including cargo winches, electric capstans and other deck machinery as well as condensers and engine room auxiliaries. The firm approached the task in hand with characteristic energy and perseverance and their marine machinery lines are being rapidly filled up with well designed and carefully built units. At the present time the concern is furnishing all the castings, fittings, condensers and auxiliary machinery for the ten large steel vessels building at the Columbia River Ship Building Corporation's plant at Portland, Oregon.

The plant of the Smith & Watson Iron Works has recently been entirely reconstructed and new and substantial brick buildings have been added throughout. The shop equipment has also undergone radical changes, new and modern tools of sufficient capacity to handle the largest ship work have been installed, overhead handling equipment has been entirely renovated and the shops placed in the very best condition to meet the heavy demand for marine work which has appeared not in any sense as a substitute for the large logging machinery business hitherto enjoyed by this firm, but as an addition to it, the demand for logging machinery having been stimulated of late rather than falling off.

U. S. STEVEDORING AGREEMENT

The United States Shipping Board authorizes the following relative to the adjustment and control of wages, hours, and conditions of labor in the loading and unloading of vessels on the Atlantic, Gulf, and Pacific coasts:

In order to adjust disputes and grievances over wages and conditions of labor without strikes or lockouts a plan has been agreed upon which has the approval of the U. S. Shipping Board, the Secretary of War, the International Longshoremen's Association, the Secretary of Labor, Mr. Gompers, president of the American Federation of Labor, and the chief shipping operators. The plan adopted provides for a National Commission, comprised as follows: One member appointed by the Shipping Board, one by the Secretary of War, one by the International Longshoremen's Association, and one by the committee on shipping of the Council of National Defense.

The National Commission will appoint in each important port a local adjustment commission made up of one member to represent the Shipping Board and the War Department, one nominated by the Longshoremen's Association, and one nominated by the carriers.

Any dispute which can not be settled by the local commission will have to be referred to the National Commission. The union scale of wages, hours, and conditions in each port shall be adopted as the standard. The decision of the National Commission shall be binding on all parties, and in all cases work shall continue

The "Golden Gate," built by the Seattle Construction & Drydock Company, and fitted to burn either coal or oil, her furnaces being fitted with Wager bridge walls.

without interruption, pending the action of any local commission or the decision of the National Commission.

The War Department has appointed Walter Lippman, assistant to the Secretary of War, as its representative on the National Commission. The International Longshoremen's Association has appointed Mr. T. V. O'Connor of Buffalo, N. Y., its representative. The committee on shipping of the Council of National Defense has appointed Mr. P. A. S. Franklin as a representative in all cases involving foreign trade, and Mr. H. H. Raymond to action cases involving coastwise service. The Shipping Board's representative will be Vice-Chairman Stevens.

The Government feels confident that this agreement provides a fair method for the adjustment of wages and conditions of labor, and that the work of loading and unloading vessels will proceed without strikes and lockouts during the period of the war.

AN IMPROVED FURNACE BRIDGE WALL

The objects of the Wager Patent Improved Furnace Bridge Wall, pictures of which are shown below, is to provide at moderate cost a bridge wall which can be easily removed and replaced without sacrificing material. The bridge wall is made of gray cast iron in sections to suit conditions and is guaranteed for one year. It is far superior to the old style brick wall for the reason that it does away with all clay and fire brick in the furnaces. By admitting air through small openings at the crest of the bridge almost complete combustion of gases before entering the tubes is secured and the stack temperature is consequently lowered with a corresponding increase in the efficiency of the boiler. In a coal burning furnace it reduces the consumption of coal and at the same time acts as a smoke-consumer, an important consideration in these days on account of the desire to remain invisible as far as possible as well as on the count of fuel economy.

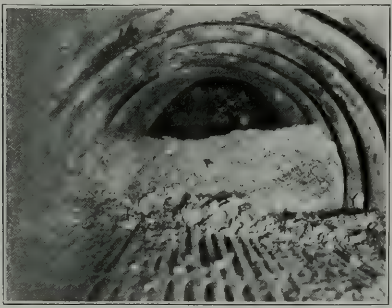
The supporting casting for the grate bars and bridge walls is provided with suitable openings to admit air from the ash pit through bridge wall sections to the fire, thus doing away with the usual pile of dead fire against the bridge wall and giving full grate surface at all times.

When assembled, the bridge wall sections are securely locked, but can be easily removed at any point without disturbing the general assembly.

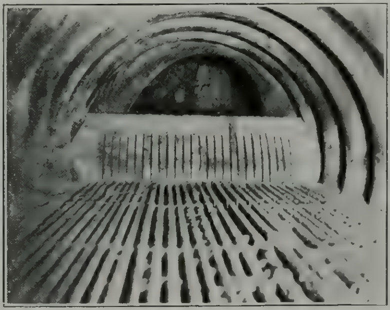
For inspection of boilers, or where steamers burn oil and coal and it is desired to change the furnaces over from the use of one fuel to the other, the whole bridge wall can be removed in one-half hour and replaced in one hour, without destroying any of the same. This of course is a very marked saving both in time and expense as compared with the old fire brick and clay wall.

In the case of the accompanying photographs, Fig. 1 shows a brick wall after a run of 4000 miles while Fig. 2 shows a Wager bridge wall after a run of 40,000 miles. The photograph at the top of the page is of the steamship "Golden Gate," built at the yards of the Seattle Construction and Dry Dock Company. The "Golden Gate" is fitted to burn either coal or oil and her furnaces are all fitted with Wager Patent Improved Furnace Bridge Walls. Other vessels similarly fitted in the Northwest are the "Storviken" fitted to burn coal only, the "Key West" a coal burner and the "Niels Nielsen" burning either coal or oil. Ten other steamers building at Portland and Seattle are to be fitted with Wager bridges.

The well substantiated claims for the Wager bridges include a saving in the time used in cleaning fires as no clinkers adhere to these bridges. These bridges possess great durability, secure better combustion and are equally applicable to the use of hard or soft coal. They have proven their merit in the marine field and already over fifteen hundred installations are in use.



The interior of a furnace fitted with a fire-brick and clay bridge wall, showing the effects of 4000 miles of steaming.

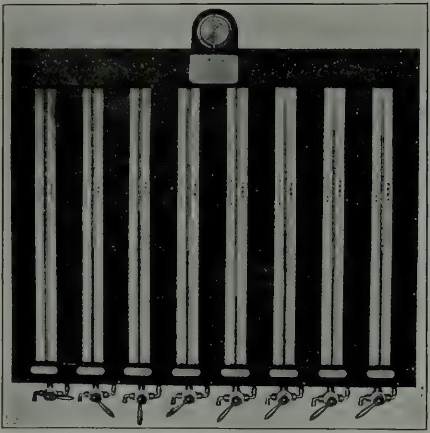


Interior of a furnace fitted with a Wager patent bridge wall, taken after the vessel had steamed for 40,000 miles. Note the absence of clinker.

Pneumercator Company Furnishes

Draft Indicators---Tank Indicators

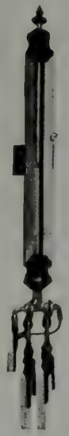
Model D-I Pneumercator indicates the fore and aft drafts of a vessel and registers the mean draft and corresponding tons displaced. Shows trim, checks invoices and deliveries, weighs cargoes and bunkers.



MODEL M. T. I.—MERCHANT TYPE

Model T-I Pneumercator indicates depth and volume or weight of fuel oil, fresh water, ballast tanks or bilges. Checks invoices or withdrawals. Furnishes perpetual inventory. It works equally well on tanks open to the atmosphere, under pressure or vacuum.

Distant Gauge Glasses



This instrument will indicate the height of the water in a boiler at any reasonable distance from the boiler and either above or below it. It will indicate instantly all water level changes.

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The "Lieutenant Demissiessy" on trial. This vessel was built by Skinner & Eddy, Seattle, her ownership changing three times before delivery. Her boilers are fitted with the Coen patent furnace fronts and the Coen oil-burning system is installed. This system allows of her being changed over from oil to coal and vice versa with a minimum of labor and time.

TRIALS OF THE "DEMISSIESSY"

One of the most interesting and highly successful trial trips held on Puget Sound during the past few weeks was that of the "Lieutenant Demissiessy" which was being finished to the order of the Messageries Maritimes of Marseilles at the time of the commandeering of vessels building in the United States for foreign owners by the Government.

The trial tests were made on the government measured course of Vashon Island and some splendid results were obtained. The vessel is a 8800-ton deadweight freighter 410 feet 5½ inches long, 54 feet moulded beam and 29 feet 9 inches moulded depth. The "Demissiessy" is one of two steamers purchased by Mitsui & Company from the Skinner & Eddy Corporation and afterwards disposed of by the Japanese house to the big French steamship line. On trial she was handled by Captain "Buck" Bailey and among those on board were John W. Eddy, vice-president of the Skinner & Eddy Corporation; David Rogers, general manager of Skinner & Eddy; Pierre d'Humilly de Chavilly, French vice-consul at Seattle, and W. A. McGee and J. B. Morris of the Seattle office of the Emergency Fleet Corporation.

The fire room equipment of the vessel consists of three single ended Scotch boilers 14 feet 9 inches in diameter by 11 feet long and fitted for 210 pounds working pressure. Each boiler is fitted with three Morrison furnaces. The furnaces are fired by the Coen mechanical oil burning system installed by the Skinner & Eddy Corporation under the supervision of Mr. Victor Jenkins, Seattle representative for the Coen system.

An outstanding feature of the Coen system lies in the manner in which it has been adapted to boiler furnaces where it is required that frequent changes be made from oil to coal and vice versa. In the case of the "Demissiessy" the standard Morrison coal-firing furnaces are used, the only change being made was to remove the fire-doors which hold the burning equipment. In place of the brick ring usually used, a sectional, cast-iron, combustion baffle plate was substituted. This plate is installed in five pieces and can be removed through the ashpit door when the steamer is to burn coal and replaced again when she is changed over to burn oil once more.

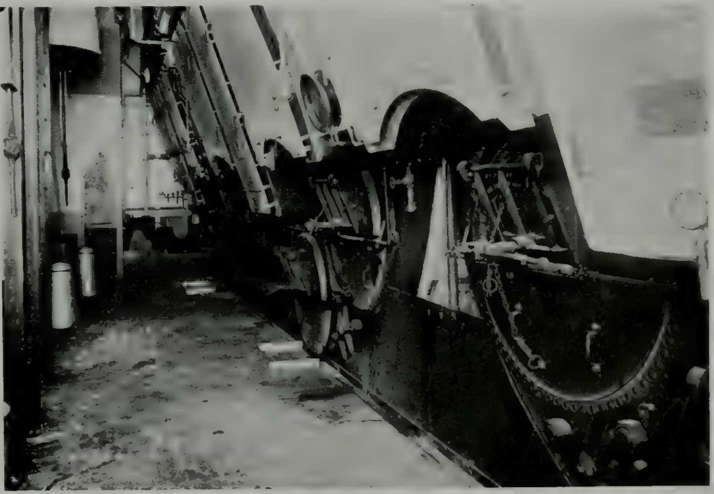
The lower half of the furnace plate is hinged to the upper half to permit to serve as an ash door when the boiler is burning coal, while the upper half is bolted to the front of the boiler. The lower half of the furnace plate is provided with a separately hinged door which may be opened to any desired position and secured by a chain, this being for the purpose of admitting air when oil is being burned.

An oil burner extends through and is secured in a door which is pivotally mounted on lugs on the upper half of the furnace door, and this door carries a second door, also pivotally mounted. This door may open inwardly to permit the admission of air to the upper half of the furnace box and is secured in any desired position by a chain.

The baffle plates are so arranged as to be readily adjustable so as to allow the outer periphery of the segmental plates to fit the interior of the furnace box.

In actual practice it will be seen that the combustion baffle plate divided the fire-box into a forward air chamber and a combustion chamber. The space between the furnace front proper and the plate depends entirely upon local conditions and may be increased or decreased at will. The central opening permits the atomized oil from the burner to freely discharge into the combustion chamber in the direction indicated, and, as air is admitted through both the lower and the upper doors, an ideal distribution of incoming air and the atomized oil is obtainable.

The inwardly extending cooling ribs, being exposed to the comparatively cool incoming air, prevent the plate from overheating and burning.



Fire-room of the steamer "Lieutenant Demissiessy," showing arrangement of Coen furnace fronts and burners.

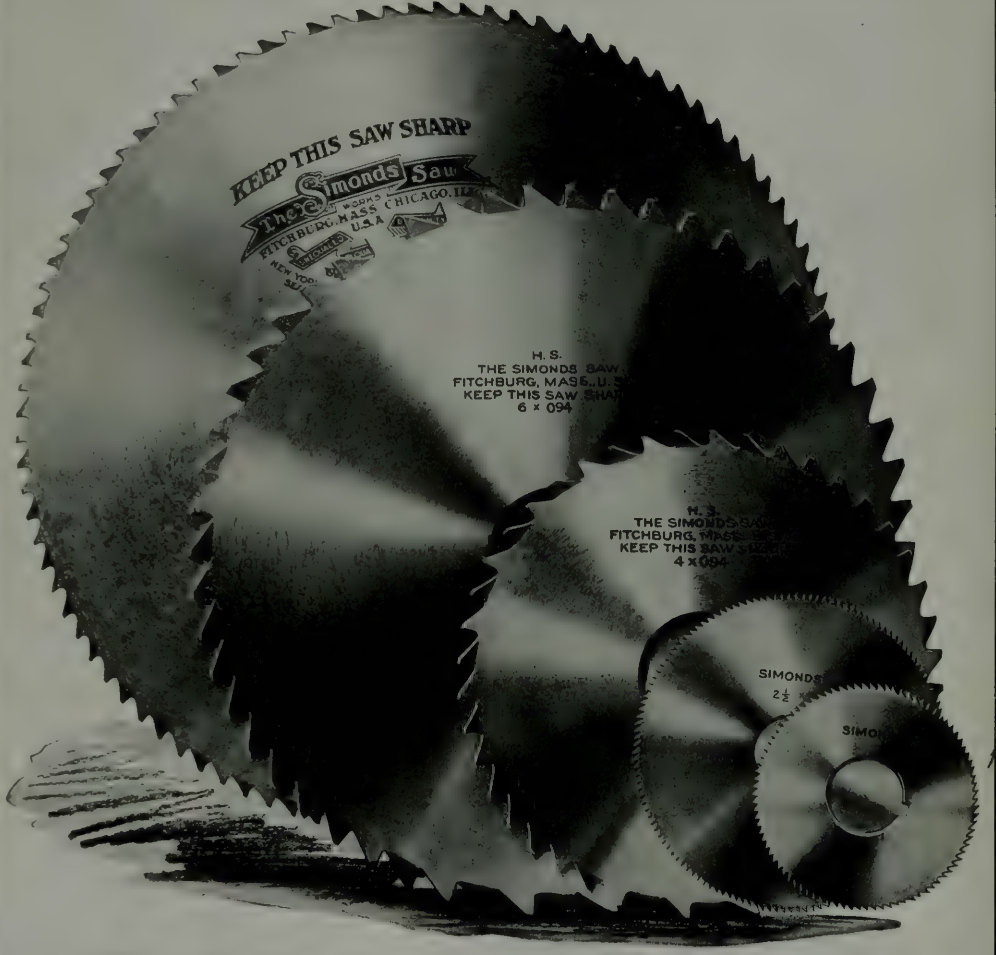


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Fig 1

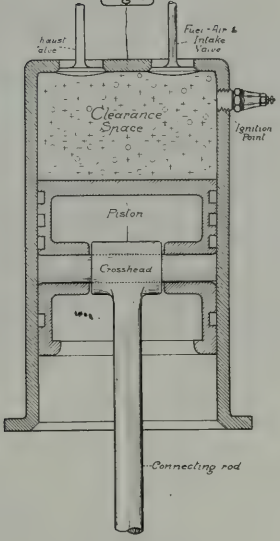

Diagram of the ordinary type of internal-combustion engine cylinder and piston.

THE "SORG" ENGINE

A great deal of interest is being manifested in the appearance of the Pacific Sorg Oil Engine Company upon the marine engine horizon. Attention is chiefly drawn to the Sorg engine through the fact that while the mechanism and mechanical operation of this internal combustion motor is exceedingly simple, yet its outstanding features are such radical departures from ordinary Diesel or semi-Diesel engine practice that they will at once attract the attention of the engineer.

Herewith are shown two diagrams, one depicting roughly the cylinder of the conventional engine while the other shows a cross section of a Sorg engine cylinder. The diameter of the two cylinders are alike and the cubic contents of the clearance space over the pistons are the same.

It will be at once noted that the claims for the Sorg engine are based largely on advanced theories relative to the consumption of gases rather than on purely mechanical features.

In the internal combustion engine during the compression stroke the clearance space is filled with the fuel gas, aid and burnt gases and the burnt gas remains to a greater or lesser degree at the end of each scavenging stroke to mix with the new charge of fuel and air during the charging stroke. This burnt gas is one of the chief causes for uncertain operation in any internal combustion motor that is not functioning properly. In ordinary engines it is impossible for the gases to thoroughly mix during the short space of one suction stroke. The result is that there may not be a rich ignitable mixture at the point of ignition, resulting in the engine mis-firing.

In the Sorg engine, actual tests have indicated that at the end of the compression stroke the cylinder contents are in regular strata, the dead air and gas being in contact with the piston head while the rich fuel mixture has been forced too near the top of the combustion chamber or at the point of ignition.

At the beginning of the suction stroke, the air valve "C" is opened before the fuel valve "D" and the air passes through into the cylinder. This air mixes with and cools the burnt gas making back-fire impossible when the fuel enters. When the piston has traveled about one inch downwards, the fuel valve "D" opens and the fuel mixture, atomized oil and gas, comes down the combustion tube driving the burnt gas before it. On the compression stroke which follows the relative positions of the different cylinder contents do not materially change.

The fuel mixture which enters the fuel valve "D" and passes down the combustion tube consists of air and finely divided particles of fuel oil. The fuel valve by reason of its location and shape forces the particles of fuel in contact with the heated walls of the tube thus converting the oil into dry gas before it reaches the cylinder proper. This prevents carbon deposits on the piston head.

In engines where the ignition takes place near the center of the volume of gas there is in a measure an explosive effect. In the Sorg Oil Engine, however, the tubular shape of the clearance space prevents this effect, it having been discovered that a flame passes through a gas mixture in a tube at the rate of about twenty feet per second, this rate, of course, depending

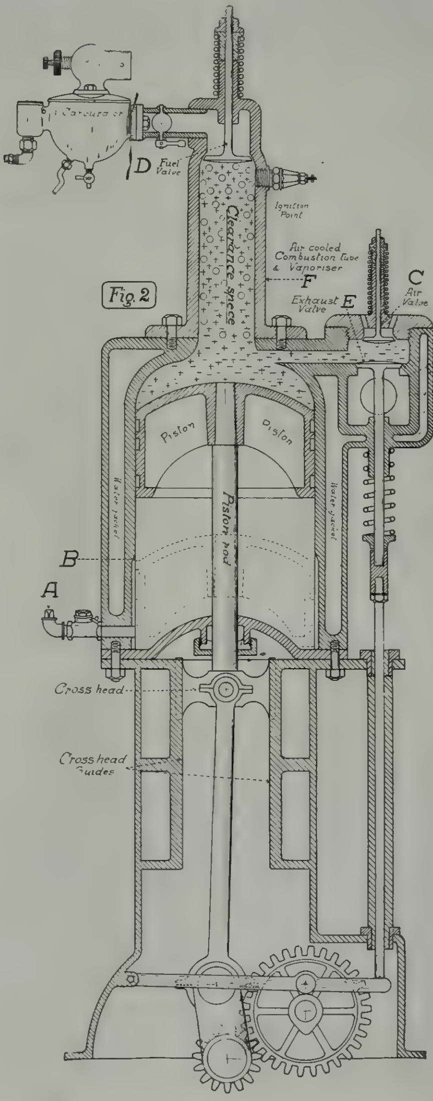

Diagram of the Sorg engine cylinder and piston, showing the tube effect of the clearance space.

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The home of the Air Reduction Sales Company of Emeryville, California.

upon the shape, bore and temperature of the tube as well as on the nature of the gas. For this reason, although ignition takes place in the Sorg engine about fifteen degrees ahead of dead center, only a small portion of the fuel charge is ignited prior to the piston passing the dead center and the major part of the fuel charge is consumed while the piston is between ten and thirty degrees past center. This travel of flame in a tube shaped structure makes the shape of the combustion chamber determine the speed of the engine. In operation, the walls of this chamber or tube are kept at about 650 degrees Fahrenheit.

The claims made for the combustion chamber on the Sork engine may be briefly summed up as follows: It acts as a vaporizer converting the particles of heavy oil into a dry gas during the charging stroke; it forces the cylinder content to stratify thus insuring a rich mixture at the point of ignition and finally that it insures a better distribution of the enerby obtainable through the consumption of the fuel charge and avoids abnormal cylinder pressures at the time the piston is passing over the dead center.

A vital point with all internal combustion motors is that of cylinder lubrication. In the Sorg engine air is admitted to the under side of the piston at point "A" during both compression and scavenging strokes. Cylinder oil is automatically introduced through this same air intake. Sufficient air is admitted to insure a five pound compression in the lower chamber at the termination of the stroke. As soon as the piston has passed over the upper end of the grooves in the cylinder walls at point "B," the compressed air rushes through the grooves into the working end of the cylinder carrying particles of oil with it. This oil is deposited on the face of the piston and rings thus affecting a sure lubrication at a number of points. This lubrication is effected at the cool end of the cylinder at the time there is no fire in the cylinder and is applied during each revolution of the engine. After having performed its function as a lubricant, the cylinder oil is vaporized in the combustion chamber and converted into fuel mixture for the engine. This lubricating system permits of the use of low grade lubricating oils.

The Sorg engine has many other points of interest aside from those already enumerated such as the use of the ordinary electric igniter for firing the fuel charges. Yet the engine marks a development in internal combustion motors along radical lines and should prove of interest to both marine and stationary engineers who are already manifesting considerable interest in the Sorg engine now on exhibition. The Pacific Sorg Engine Company has opened offices at 24 California street, San Francisco.

THE MANUFACTURE OF OXYGEN

The Air Reduction Sales Company recently completed one of their oxygen producing plants at Emeryville, Cal. This plant, views of which are shown herewith, is typical of the establishments organized by this company throughout different sections of the country.

The rapidly increasing use of flame cutting and welding throughout the United States has created a tremendous demand for oxygen and the establishment of the Air Reduction Sales Company's plants in various parts of the country is in answer to this demand.

Within the past two or three years practically all metal working industries have come more and more to appreciate the value of cutting and welding by flame and torches and the necessary equipment and supplies are now considered an essential and important feature of the outfit for a modern shop. The use of these torches has wrought many radical changes in shop practice.

Steel foundries are utilizing the cutting features of the oxy-acetylene process for the removal of gates and risers, many plants having given up entirely their saw equipment by which these operations were formerly accomplished.

Plate working and fabricating establishments are enabled by the use of cutting torches to handle a large part of their work to much greater advantage than by the older methods in vogue. The rapidity with which this class of work can be done is in itself a most valuable feature, but in addition to this a great deal of expensive handling is eliminated.

Oxy-acetylene cutting and welding equipment is of a

The heavy demand for oxygen has necessitated an extensive plant for its production.

very portable nature and the fact that it can be carried to the job instead of its being necessary to move the job to the machine has proven another decided advantage in favor of this over the older methods of welding and cutting.

When once welded and cutting has found a permanent place in the activities of an establishment, an adequate and dependable supply of oxygen becomes imperative. So wide and varied a field has opened up for the use of the oxy-acetylene apparatus that the demand for oxygen has increased by leaps and bounds.

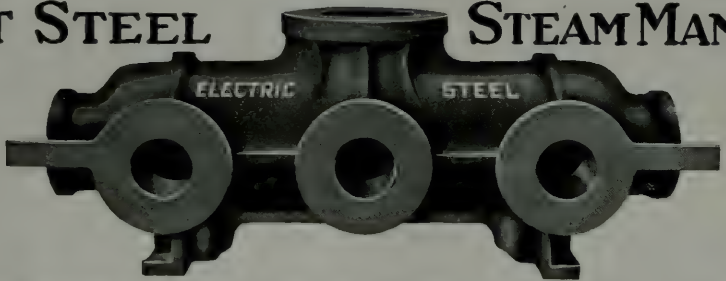
The large oxygen producing plants established by the Air Reduction Company are the results of what has grown to be a wholesale demand for oxygen up and down the Pacific Coast.

The raw material entering into the manufacture of Airco oxygen is free air, from which the oxygen is extracted by the liquid air process. The Air Reduction Company has acquired the rights of the Claude Liquid Air Process by means of which a large volume of high quality oxygen can be produced. The Airco oxygen service is rapidly spreading and growing on the Pacific Coast and the yellow containers in which this product is being shipped are familiar sights in many shipyards, machine shops, foundaries and other metal working establishments.

A NEW COOLER AND LUBRICANT

Much interest is being manifested by shop owners and operators in the new cutting and cooling fluid Oil-No-More, a product which has been developed in the

CAST STEEL STEAM MANIFOLD



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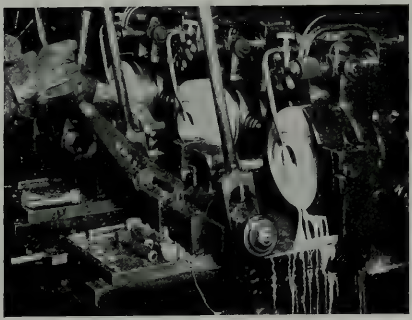


laboratories of the Mt. Hood Soap Company of Portland, Oregon.

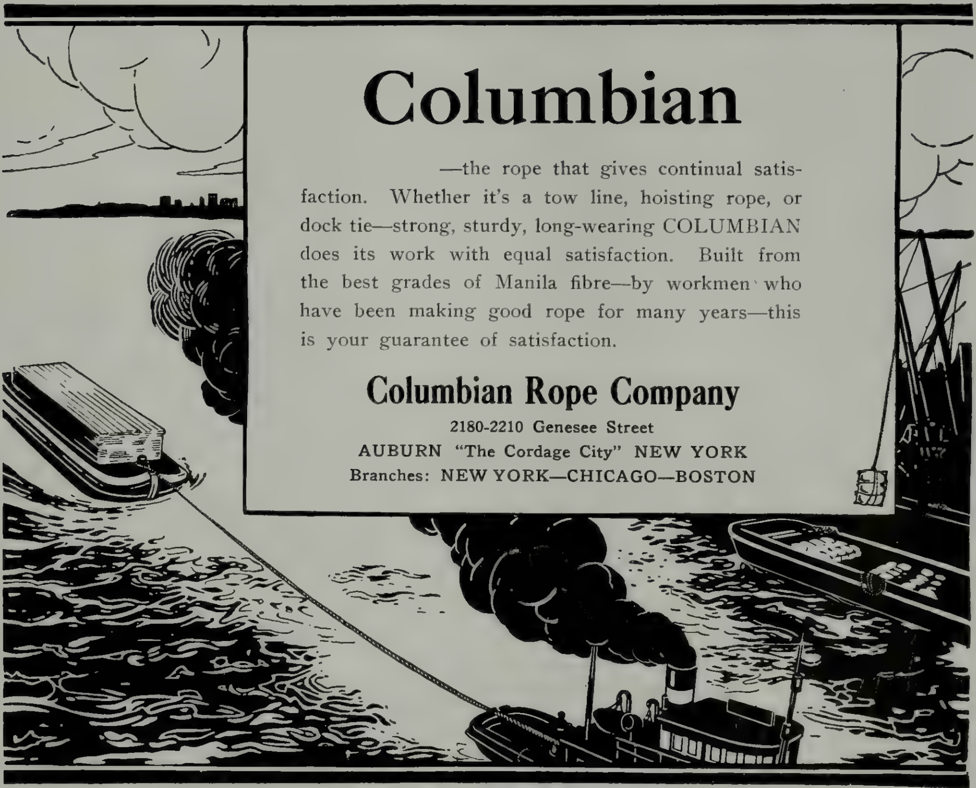
Water is a superior cooling agent but not a good lubricant while on the other hand some oils are excellent lubricants but not good cooling agents. In Oil-No-More, the Mt. Hood Soap Company have an agent that when mixed with water gives a very superior cooling agent and a most satisfying lubricant.

Used on drilling, tapping, threading or reaming tools, this new cutting and cooling agency has proven itself to possess some remarkable qualities. It does not separate, gum up, rust or become rancid. The mixture is non-explosive and proof against spontaneous combustion.

Oil-No-More is a compound with which water is mixed by merely pouring the required amount of water into the compound; the proportions of course depending upon the kind of metal being worked, size of stock and speed of the machine. Roughly speaking for ordinary steel the mixture should be made up of one part compound to ten parts water; tool steel would require a heavier mixture but never in greater proportion than one to four. Automatic screw machines use a mixture of one to five; turret lathes from one to seven to one to twelve; for milling, stamping, drilling, tapping, punching, planing, etc., one to twenty and for grinding from one to thirty to one to fifty parts of water.

The most remarkable thing about this new compound is its low price. This is highly important as it will result in many small shops adopting the use of cutting and cooling compounds that have never used these adjuncts to machine work before. This will mean the speeding up of many tools now run at far below their possible speed of cutting and there will also be a saving in the wear and tear on taps, drills and cutting tools.

Oil-No-More is a water soluble oil sold in concentrated form and may be mixed with from five to fifty parts of water, according with the work in hand. It cuts fine threads with no drag in the cut, the machine works easier and the dies last longer. It will thread the hardest stock without causing smoke and will produce clean, bright, perfect threads. It will not clog the circulation pumps. It has the right consistency to carry the chips away from the tool. It permits greater speed by keeping the tool and chips cool and permits heavier feeds and deeper cuts. For reaming or other turret lathe operations, production will be noticeably increased and high duty turret lathes may be kept operating at full speed without fear of overheating the work or gumming or rusting the machine.



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—the rope that gives continual satisfaction. Whether it's a tow line, hoisting rope, or dock tie—strong, sturdy, long-wearing COLUMBIAN does its work with equal satisfaction. Built from the best grades of Manila fibre—by workmen who have been making good rope for many years—this is your guarantee of satisfaction.

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DIAMETERS ½" TO 1½"
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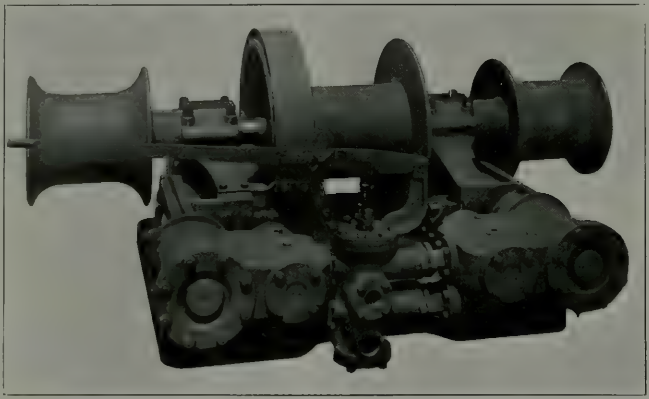

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Large Flat Strapping
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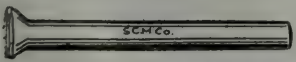

SCHAPER CONSTRUCTION MATERIAL CO.
90 WEST STREET
NEW YORK

The home of Brown Bros. Welding Co. in San Francisco.

THE WELDING OF CONDENSER TUBES

The Brown Brothers Welding Company has found it necessary after eighteen months of operation to triple the floor space of its San Francisco headquarters at 223 Main street. The rapid increase of business enjoyed has been largely due to the energetic manner in which the firm has kept its equipment fully up to requirements, having at all times been ready to accept any work that could be accomplished through the oxy-acetylene process, whether this work could be brought to the shop or the apparatus had to be transported to the job.

The second picture herewith shows a ship test on a welded joint in a one inch by twenty foot brass condenser tube. One thousand of these tubes were welded recently by Brown Brothers, the 20-foot tubes being made by welding 8-foot and 12-foot pieces of tubing together. These tubes stood the pressure and whip tests in an excellent manner and after the welding was finished and the tubes ground down to size they were tinned.

Ordinarily in salvaging condenser tubes, the tube is cut off on both ends enough to remove the bad places where they are necked down by the pressure of the packing and then a short piece is welded to one end to make the tube the original length. In this way thousands of tubes are being reclaimed at a nominal cost which would be otherwise sold for scrap or cut into shorter lengths. Owing to the present scarcity of brass tubing in some sizes, the acetylene welding torch is keeping many a condenser in commission today.

BOOKS AND CATALOGS

VOLUTE CENTRIFUGAL PUMPS is the title of an interesting little booklet issued by the Worthington Pump and Machinery Corporation. Generally speaking centrifugal pumps are divided into two types, the volute and the turbine pump. The Volute pump derives its name from the form of the casing which is similar in shape to the involute curve. This catalog describes the different types of Volute Centrifugal Pumps manufactured by Henry R. Worthington and contains valuable data.

YEAR BOOK OF THE NETHERLANDS EAST INDIES, 1916. This handsome publication contains a great deal of valuable data on the Dutch East Indies presented in a readable and straightforward manner. This year book was compiled by the "Sub-Department of Commerce and Industry" of the Department of Agriculture, Commerce and Industry of Buitenzorg, by the request of the Netherlands government.

The chief aim of the publication, the present being its first edition, is to give the public, both in Holland and other countries, some idea of the conditions prevailing in the Dutch colonies, of the results achieved by Holland as a colonial power and of the development of agriculture, industry and commerce. With this end in view the book has been published both in Dutch and English.

The material contained in this book is derived from several well known works on the Dutch East Indies, from the annual reports of branches of the government service and of private enterprises, and from other official reports. In compiling statistics the reports for 1914 have been used except in cases where the revised figures for 1915 were also available at the time of publication.

Anyone interested in this publication should apply for same to the Netherlands Consul General, 665 Mills building San Francisco.

THE RULE OF THE ROAD AT SEA AND PRECAUTIONARY AIDS TO MARINES, by Daniel H. Hayne, 170 pages, diagrams and illustrations, published by the Co-operative Publishing Co., Baltimore Md.

This manual is well arranged and should be of value at this time when so many young men are taking up the sea as a calling. The work is in no sense a book on the subject of navigation but rather an adjunct giving very complete knowledge of the rules of the road. Whenever a subject drifts too far into the legal or technical to be readily understood, references are given to books where complete information in reference to the point at issue may be obtained.

Whip test of a 20-foot welded brass tube made up of an 8 and a 12-foot length.

PULLMAN UNIT SASH BALANCES: In the marine catalogue 33 of the Pullman Manufacturing Company of Rochester, N. Y., that concern has issued an interesting pamphlet on Pullman unit sash balances for railroad and marine work. The balance cases for marine work are made of pressed brass and as a further precaution against the action of salt water the tape, spring and revolving drum are entirely enclosed.

SMACK COPPER PAINT: The Federal Composition and Paint Company of 17 Battery Place, New York, have issued an attractive leaflet on their Smack Copper Paint. J. and R. Wilson, Inc., of 127-136 Steuart street, San Francisco, are the local distributors for this well known product.

BEAUTIFUL FLOORS: Is the title of a little booklet issued by the Murphy Varnish Company of Newark, New Jersey. The book is illustrated with well executed pen and ink sketches and contains valuable information concerning the dressing and care of floors.

WANTED—Ship draughtsman, thoroughly experienced in either wood or steel construction. Apply, stating experience, salary expected, and when at liberty.

Address, Draughtsman, care Pacific Marine Review.

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MARINE OIL ENGINES

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HOT BALL OR HOT HEAD
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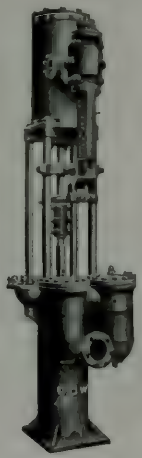

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UNIT
SASH BALANCE
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ESPECIALLY suitable for vessels of all kinds from yachts and ferry boats to ocean liners and naval vessels.

The Pullman Unit Balance is a simple and effective device for perfectly balancing window sash; it works smoothly and is practically noiseless.

The Pullman Balance has been in use successfully for over thirty years. Our ten year guarantee goes with every Balance.

Made of pressed brass. Working parts entirely enclosed.

Write for descriptive Catalog, showing method of installation.

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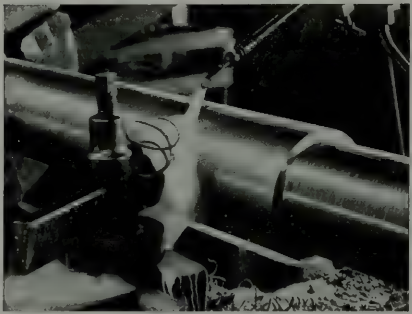
FOR METAL CUTTING WITH WATER MIXTURE

THE GUARANTEED COOLING AND CUTTING LUBRICANT



Can be mixed instantly with water according to the kind of work to be done, Cutting, Drilling, Reaming, Milling, Tapping or Grinding, in the proportion of one part of OIL-NO-MORE to 10 parts of water, and as high as one part of OIL-NO-MORE to 40 parts of water according to the work to be done. COMPARE YOUR COST TO THIS.

Put up in 5 and 10 gallon cans, half-barrels and barrels.

Your trial order is solicited. We ship on 30 days approval.

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Average Adjusters

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C. B. SLOAN & CO.
Crocker Building San Francisco, Cal.

CONCRETE SHIPS: The Portland Cement Association of 111 West Washington street, Chicago, has collected and published in booklet form valuable data on the progress made during recent years in the problem of securing a reliable concrete ship for ocean going purposes. The booklet is well illustrated with plans and photographs and brings the progress in the art of adapting concrete to ship construction right up to date.

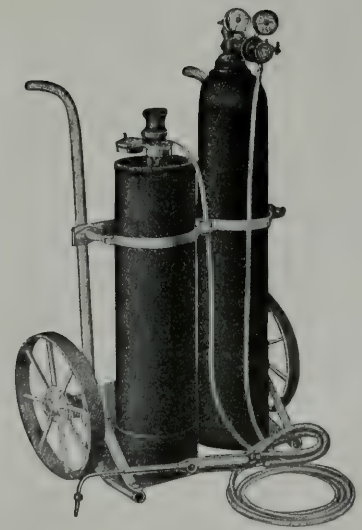
ANTI-INJUNCTION BILL: This is a reprint of the able argument of Max J. Kuhl, attorney of the San Francisco Chamber of Commerce, before Hon. William D. Stephens, the governor of California, against the Anti-Injunction Bill. The argument is a splendid bit of reasoning and is well worth preserving.

THE GREAT FUTURE OF REFRIGERATION IN RUSSIA: This is the title of a highly instructive article appearing in the August, 1917, issue of "Russia" and written by Mr. J. H. Torney, second vice-president of R. Martens and Company, Inc. The article points out the fact that refrigeration in Russia is almost a minus quantity and that the vast meat supplies of that republic are only utilized in a partial and highly wasteful manner. The writer believes that the greatest opportunity for American capital in Russia will be found in the development of the meat packing industry in conjunction with the building of needed railroads, the two, necessarily, going hand in hand.

MACHINE GUN PRACTICE AND TACTICS for Officers, Non Commissioned Officers and Men by Lieut. K. B. McKellar of the Canadian Machine Gun Service, the MacMillan Company, 66 Fifth avenue, New York, 165 pp., 90 cents net. The author of this book has been at the front for the past three years instructing men for active service. The methods of organization of machine gun units and the sequence of the training set forth embody the results of this valuable experience. The book is well illustrated with diagrams and is of special interest and value at this time.

BUILDING PROGRAM—U. S. SHIPPING BOARD

Ships	No.	Tonnage	Estimated cost
Contracted for	433	1,919,200	$285,000,000
Ready to be contracted for when funds are available	452	2,968,000	455,500,000
Under negotiations	237	1,281,400	194,000,000
			$934,500,000
Miscellaneous	150	1,800,000	300,000,000
Organization and other miscellaneous expenses			35,000,000
Amount authorized by Congress June 6, 1917 ($200,000,000 appropriated)			550,000,000
Amount to be authorized for building program immediately in sight, making no allowance for changes in cost or labor and material			719,500,000
COMMANDEERING PROGRAM			
For commandeering ships, amount required			$515,000,000
For commandeering ships, amount authorized by Congress June 6, 1917			250,000,000
Balance required authorized by Congress			$265,000,000
PURCHASE PROGRAM			
For vessels to be purchased other than under construction or commandeered			$150,000,000
SUMMARY			
Total amount, in round figures, to be purchased in addition to amounts already authorized:			
For commandeerer vessels			$265,000,000
For construction of new vessels			719,500,000
For purchase of new vessels			150,000,000
Grand total			$1,134,500,000
Amounts desired to be appropriated for remainder of fiscal year 1918:			
For commandeered vessels			$365,000,000
For building program			400,000,000
For purchase of vessels			150,000,000
Total			$915,000,000



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Fore River Shipbuilding Corp.
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Moore & Scott Iron Works
Collingwood Shipbuilding Co.
Pennsylvania Shipbuilding Co.
Baltimore Dry Dock & Shipbuilding Co.
Peninsula Shipbuilding Co.
American Shipbuilding Co.
Chas. Ward Engineering Works
Ames Shipbuilding & D. D. Co.
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Albina Engine & Machine Works
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The wireless equipped ship telegraphs her orders for repair parts while far at sea and finds them waiting on the dock upon arrival. Time is money.

Cutting & Washington Wireless

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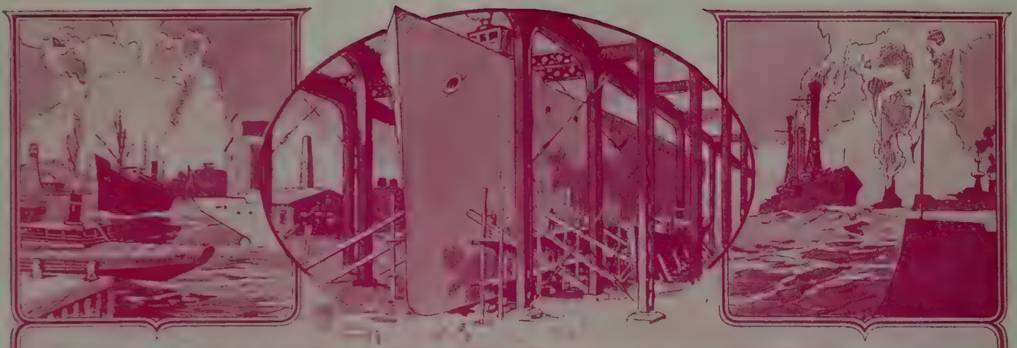
PACIFIC MARINE REVIEW

NOVEMBER 1917



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THE abnormal increase in the Oxygen requirements of Pacific Coast ship yards during the past year has put Linde service to a mighty test.

To meet the issue we have rushed to completion a second manufacturing unit at San Francisco and another at Los Angeles—tripling our output at each of these points. With equal speed, we are now working night and day on a huge capacity plant at Seattle.

The completion of the last of these extensions a few weeks hence means that we will have, through super effort in the face of great obstacles, increased our manufacturing facilities in the coast district over nine hundred per cent in eighteen months.

And—between times, to meet the strain on these coast stations, we have been maintaining stocks through relief shipments from supporting Linde oxygen plants as far east as Chicago, St. Louis and Milwaukee.

These relief shipments which have totaled over two hundred cars to date have been brought forward in the face of extra shipping expense averaging over ten thousand dollars per month.

We believe that all shipyard operators will appreciate the strength and flexibility of this unusual service as a practical guarantee of our ability to supply the oxygen requirements of Linde patrons under any conditions which these abnormal times may develop.

Linde Air Products Company—Pacific Coast

San Francisco
Kohl Building

Los Angeles
1405 Mission Road

Seattle
530 First Ave., South

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Service Backed by Interlocking Chain of Sixty-Four Plants and Warehouses Extending from Coast to Coast

LINDE
OXYGEN
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THE LINDE AIR PRODUCTS CO

PACIFIC MARINE REVIEW
The National Magazine of Shipping

VOL. XIV, No. 11 SAN FRANCISCO NOVEMBER, 1917

Shipping After the War

By E. J. Forman

Assistant Traffic Manager, Port of Seattle

(Abstract)

FOREIGN commerce is the basis for all shipping. Ocean traffic reaches around the world and connects with intimate service every seaport, every colony and every nation. At this time, when international commerce is broken up with ravages of war, it seems almost impracticable to hazard any statement on shipping after the war.

Future international shipping must be considered in the light of two great events; the beginning of the greatest world war and the completion of the Panama Canal.

Four general trade routes are affected by the shortening distance through the canal.

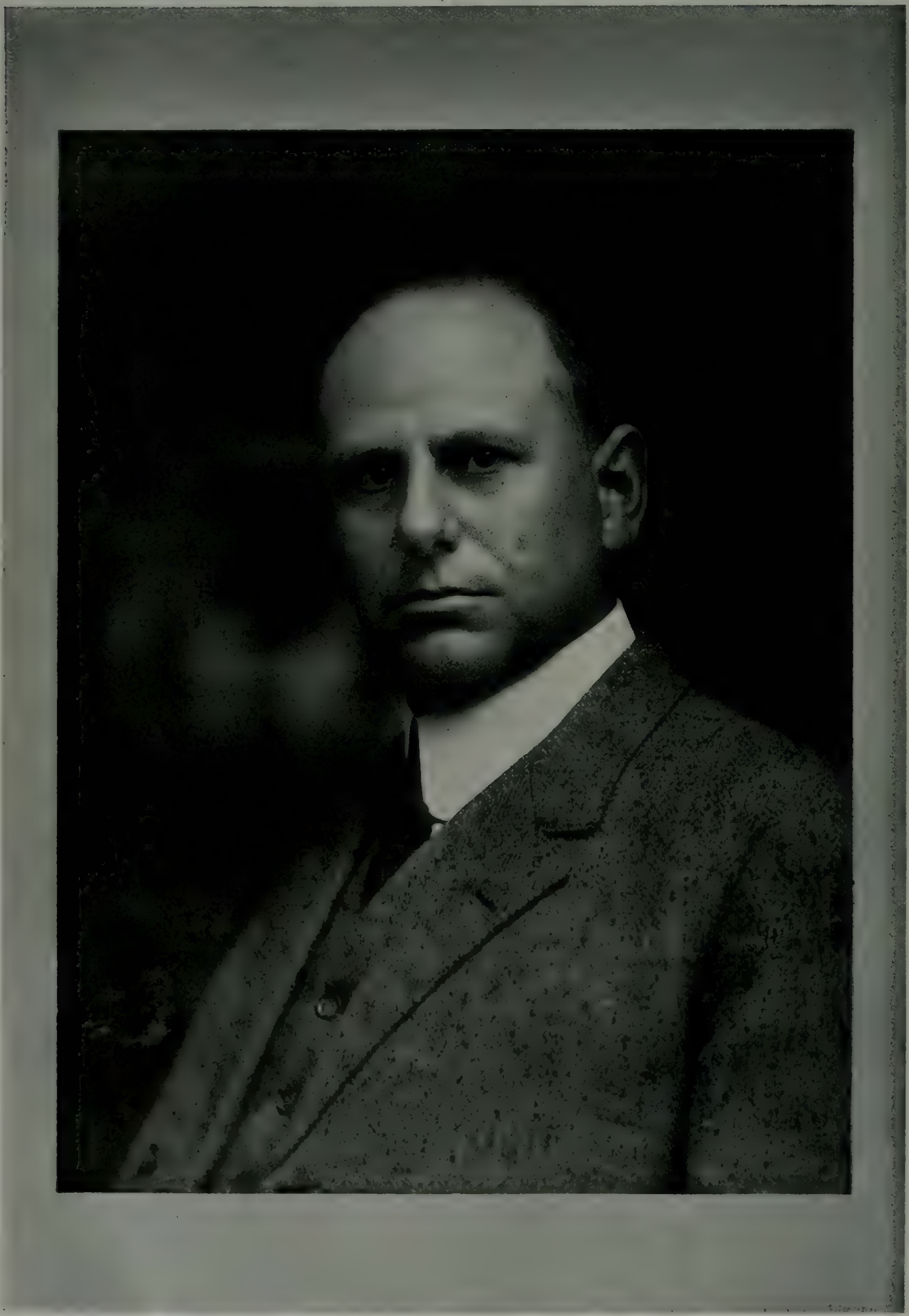
First, between Europe and the Orient. This route more than any other brings the Panama Canal in competition with the Suez Canal. The Suez route has a slight advantage in distance to Australia, China and India, but this difference in distance is more than offset by the advantage to vessels in avoiding the excessive heat of the Gulf of Aden and the Red Sea and the storms of the tempestuous Indian Ocean. The Panama route also offers vessels the opportunity of calling at New York, only 500 miles off the straight course, second largest world port, where cargoes are always obtainable.

Second, between Atlantic America and the Orient. This route will bring about a readjustment of shipping now transferred from vessels to transcontinental railroads of Pacific Coast ports. Raw materials from the Orient, Philippines and Hawaii will move all water to Atlantic seaboard factories, and return cargo will consist of steel, machinery and finished products from these factories for the new industries springing up in he now awakening Orient. By a readjustment of railroad conditions and railroad rates, that portion of that trade for the Central States will be retained by Pacific Coast ports. Loss of the trade to the Atlantic seaboard will be offset by new business created by increased population and new industries on this Coast.

Third, between Pacific America and Europe. From the days of its discovery the Pacific slope, has been effectually shut off from European immigration by the Isthmus of Panama. The close of war will see a great change. A mighty tide of European people will migrate to Pacific America through the canal and their needs will create increased industrial conditions, demanding increased shipping facilities.

Fourth, between Atlantic American ports and Pacific American ports, shortening the voyage from 6000 to 8000 miles and saving the 40 to 50 days running time. Such saving in time and mileage means an enormous reduction in freight rates, shortens the merchant's investment in goods, and makes possible industries and enterprises heretofore confined solely to the Atlantic States.

With the resumption of shipping, rates by all



A. F. Haines, Manager of the Pacific Steamship Company, who has been actively engaged in perfecting the plans of his company to enter the trans-oceanic carrying trade.

water haul between Atlantic ports and Pacific ports should be reduced to one-half of present all rail transcontinental rates. The greater the tonnage carried by ships to and from coastal ports, the greater will be the opportunities for railroads to haul it to and from the hinterland. Railroads should appreciate the greater traffic opportunities produced by economic conditions of water carriers and provide adequate connecting tracks with terminal wharves and join in through traffic agreements to build up a dependable back-haul movement to replace the loss of transcontinental traffic.

Another detrimental factor of the shipping world is the present war. It will change the world politically and commercially. Long established trade relations are broken up and stiff government-aided European trade competition has been wiped out. America has been forced upon her own resources. Raw material from South America and Asia has been imported and the finished manufactured products exported. American importers and connections in all great trade centers outside the borders of Europe. American bankers have assisted by establishing international banking agencies and new credit systems which give the exporters as satisfactory banking facilities as they find at home. Special Trade Commissioners appointed by the Department of Commerce are making exhaustive studies of trade, industrial and shipping conditions in foreign countries to aid our merchants.

Dense populations hitherto meagerly supported by products of their own soil and shops have been stirred into commercial activity. Slow processes of hand operation are changing to rapid machinery productions opening new fields for agricultural implements and machinery. Structural steel and railroad material for new railroads in Russia and China must be supplied from America. This interchange of commodities creates new desires and new trade relations in the Orient which will become permanent.

Beyond the Atlantic remnants of great European armies will return to different occupations than they left. The land made desolate by war will need rebuilding. Homes, cities and factories will call for American material and American food.

For these commercial opportunities American capital and American brokers are preparing—to replace the tonnage lost by war and to increase the tonnage necessary to carry increased foreign trade. Other nations are making ready for the new conditions. Since the war began the shipyards of Netherlands, Norway and Japan have contracted and worked their full capacity, although Japan has been wholly dependent upon the United States for steel. War has interrupted shipbuilding in Italy and France, and their yards have practically stopped construction of merchant ships. The production of England's yards has been nearly normal, a wonderful industrial feat considering the intensive demands of war, and was made possible only by abundance of steel, well established shipyards and well organized labor. Since the Civil War, shipbuilding of the United States has been confined chiefly to merchant marine for coastwise and Great Lakes traffic. Today the situation is changed. Builders have caught a glimpse of future needs and multiplied yards are turning out vessels at unprecedented rates. For the first time in sixty years American yards have exceeded the output of British yards. During the first two years of war 400,000 gross tons of American merchant vessels were destroyed or abandoned and during the same period United States merchant vessels engaged in foreign trade increased from 1,076,000 to 2,191,000 gross tons, or 108 per cent. During the last year the number of shipyards in the United States has practically doubled, and their output is only limited by the ability of steel mills to supply material.

To replace vessels destroyed and at the same time provide tonnage for increased international trade after the war, it is not hazarding too much to estimate that shipyards now in operation will be employed at full capacity for the next ten years.

Shipping, now and after the war, will prove an inviting field for investment for capital. Brisk and permanent trade interchange between nations is certain to follow the close of the war. American yards will turn out the ships and American capital should control the traffic which when properly conducted and efficiently regulated brings profitable returns on the investment.

Wholesale regulation of American shipping by the Shipping Board will have a far-reaching influence on foreign vessels engaged in traffic to and from American ports. There is no doubt that other nations seeking the effect of proper American regulation will seek to regulate their own shipping by a similar board, and the result may be effectual international control by a conference of shipping boards of all nations.

Peace declarations coupled with the canal service will bring new trade possibilities beyond the expectations of the most ardent port development advocates.

Do we fully realize our opportunities and possibilities now to prepare for the greater activities at the close of war? The world's international trade after the war will exceed the fondest hopes of shipping men and preparations should be made now for carrying this traffic in American merchant ships under the American flag.

Southern California Seaport

By Clarence H. Matsom

Secretary Los Angeles Harbor Commissioners

As a seaport Los Angeles is comparatively new. Although the Bay of San Pedro, a portion of which comprises Los Angeles Harbor today, was discovered by Cabrillo only fifty years after Columbus first sailed in quest of a new world, three and a half centuries went by before it awakened to life. Although the good old mission padres more than a century and a quarter ago built the first boat constructed in California, so far as the records show, and launched it in what is now Los Angeles Harbor, the shipbuilding industry of this locality needed the stimulus of the present war to bring it into activity. And although Los Angeles is credited by the census bureau with being the largest city on the Pacific Coast, it has done all of its harbor building since 1910.

Until 1909 Los Angeles was an inland city, both geographically and psychologically. Even yet the majority of its people know comparatively little about maritime affairs, although the city has extended its borders to the sea. They are not conversant with ships and shipping either by training or experience.

But they are an extremely versatile and progressive people, and as their trade has increased they have learned the advantages of water commerce. As a result, Los Angeles has made for itself a gateway for the trade of the world to come in and go out. The place that Richard Henry Dana described in 1835 as only an open roadstead—although one of the most important shipping places on the Pacific Coast—has been converted into a sheltered port of refuge, and an interior lagoon has been made into a commercial port which handles upwards of two million tons of merchandise a year.

Main channel looking toward the inner harbor.

The business center of Los Angeles is twenty miles from its waterfront. While this has its disadvantages in the fact that the business community is not in direct touch with marine matters, it has allowed the development of a port along strictly utilitarian lines without destroying works and property that has grown up with the city; and it further gives room for vast industrial development in the immediate neighborhood of the waterfront.

It was in 1909 that the people of Los Angeles extended the boundaries of their city and joined forces with the harbor towns of Wilmington and San Pedro. The former at that time embraced within its borders nothing more harbor-like than a wide expanse of mud flats and tidelands, but these have been dredged into basins and channels, and reclaimed for commercial and industrial uses until now they form a water terminal where such companies as the American-Hawaiian and Pacific Steamship companies dock. San Pedro embraced the outer harbor, originally an open roadstead, and the main channel leading into the inner harbor.

The purpose of Los Angeles in bringing the harbor within its boundaries was to enable it to use its capital in harbor development, and it pledged itself in 1909 to spend ten million dollars within ten years. Of this amount, $3,000,000 was voted at the time, but owing to court proceedings the actual expenditure did not begin till 1912. A year later $2,500,000 more was voted, so that the expenditures in the last five years have amounted to $5,500,000.

In addition to this, the federal government has spent a little less than six million dollars, beginning in 1871, when jetties were started to improve the then entrance. In 1896 the government started the construction of the San Pedro breakwater, which has become famous as one of the greatest works of its kind in the world. It was completed in 1910 at a cost of $3,100,000. It is a little more than two miles in length, and protects the outer harbor in such a way that it creates a fairway and anchorage of 570 acres, of which 370 acres has a depth of from 30 to 50 feet. There is no bar whatever. At the entrance at the end of the breakwater the depth is 48 feet at low tide, and there in a depth of not less than 35 feet all the way to the outer harbor docks. The breakwater is a wall nearly 200 feet thick at the base, twenty feet wide on top, and 68 feet high from the bottom of the bay. It extends 14 feet above high tide. The outer end of the breakwater is surmounted by a lighthouse 73 feet high above water level. The light is 1500 candle power, multiplied by prismatic lenses to 67,000 candle power. It has a range of fourteen miles.

Pacific Wharf & Storage Company's slip.

The outer harbor has a depth of from 35 to 50 feet, at mean low water. The east channel is 35 feet deep and 400 feet wide and the west channel has a width of 600 feet and a depth of 30 feet.

On the west side of the main channel leading into the inner harbor, and the east channel of the outer harbor is Municipal Pier No. 1. This is a solid earth fill 650 feet wide, and more than half a mile long. Along the west side of the pier, and facing the east channel, is a reinforced concrete wharf 40 feet wide and 2520 feet long, built at a cost of $477,600. The transit shed on this wharf and pier is 1800 feet long and 100 feet wide. It is of steel and asbestos protected metal, with fire walls at intervals of 650 feet. There is 600 feet of open wharf at the north end of this wharf shed, and three railroad tracks and a paved roadway in the rear.

In the center of the southerly end of the pier is a reinforced concrete warehouse, 480 by 152 feet and six stories high besides a basement. It contains more than ten acres of floor storage space and is as thoroughly fireproof as it can be made.

All of these facilities are owned and operated by the City of Los Angeles.

The "Finland" and "Kroonland" docked at this pier when in service to this port, and the "Great Northern" used this pier in its Hawaiian service. At the present time the pier is partly occupied by the Navy Department.

Private interests also have nearly 5000 feet of wharves in the outer harbor and a lease on approximately 132 acres of reclaimed land. On the westerly side of the outer harbor is an area of 171 acres of submerged land which the city has offered to the Navy Department for submarine and aviation uses and the Navy Department has prepared plans for a submarine and aviation base to cost $2,250,000 on this property.

The main channel leading into the inner harbor is nearly two miles in length and is lined with wharves on either side the greater part of the distance—railroad, lumber or municipal wharves. The railroad wharves on the westerly side of the channel are the terminals of the Southern Pacific Company, and those on the easterly side belong

American-Hawaiian ships at Pier A.

Plate shop, Los Angeles Shipbuilding & Dry Dock Company.

Municipal shed No. 3, Pier A, and a portion of the wharf erected by the City of Los Angeles for the use of the Pacific S.S. Co. The shed is 622 feet long and 100 feet wide and is equipped with passenger facilities as well as for freight. The entire wharf is 1427 feet long. An umbrella shed, 290 by 60 feet, has just been built at the other end of the wharf.

Putnam & Valentine, Photo.

Municipal shed No. 2, Pier A, 495 feet by 100 feet.

Shed No. L, Pier A, at which the American-Hawaiian S.S. Co. berths. The shed is 1005 feet long and 100 feet wide, and was the first wharf and shed built by the City of Los Angeles.

Steel freight shed, 1800 feet long, 100 feet wide, on the westerly side of municipal pier No. 1. This is an earth-filled pier, 650 feet wide and one-half mile long. The transit shed is on a reinforced concrete wharf with 600 feet of open wharf at the northerly end not shown in the picture. At the extreme left is municipal warehouse No. 1, showing its relation to the transit shed.

This plant has made very rapid progress in assembling and housing machinery and erecting building-ways.

to the Salt Lake Railroad. This channel has a depth of 30 feet at mean lower low water, and is at present 500 feet wide. The initial appropriation has been made by the United States Government, however, for widening it to 1000 feet. This will be accomplished by removing the wharves on the east side of the channel and increasing the width on that side, after which new wharves will be built.

The head of the main channel is a turning basin, 1600 feet in diameter, from which Slip 1 opens directly north, the channel to the east basin on the northeast, and the channel to the west basin on the northwest.

Slip 1 is dredged 500 feet wide and 30 feet deep, with 34 feet in the berths of the American-Hawaiian Steamship Company. The wharves on the westerly side, known as Pier "A," constitute a total length of 3515 feet. There are also three transit sheds, 626, 1000, and 495 feet in length, respectively, and of a uniform width of 100 feet. There is also a new umbrella shed 250 feet long. All of these facilities are owned and operated by the City of Los Angeles, but are used as berths by the Pacific Steamship Company, the American-Hawaiian Steamship Company and others. The Pacific Steamship Company also has exceptional passenger facilities.

On the west side of the turning basin is also a municipal wharf assigned as a berth for the Standard Oil Company. It is 500 feet long, but the business of the company has grown to such an extent that it is being extended 234 feet. In the rear of the wharf the company has seven acres of storage tanks, to which both fuel and refined oils are brought in pipe lines from the company's refinery at El Segundo.

The Union Oil Company is constructing a $2,000,000 oil refinery on land adjoining the West Basin, and has made an application to the City of Los Angeles for 1400 feet of dock space, to be provided by the city.

Besides this, the General Petroleum Company has two oil loading stations on the breakwater, to which oil is piped directly from the Central California fields.

These facilities make Los Angeles one of the greatest oil ports in the world, and the oil exports are increasing very rapidly.

On the south side of the West Basin is the plant of the Los Angeles Shipbuilding and Dry Dock Company, approximately 70 acres in extent. Last April, when the company obtained a lease on this site from the City of Los Angeles, it was nearly all under water at high tide. Since that time 30 acres has been reclaimed, a launching basin has been dredged to a depth of 20 feet, piles have been driven for four launching ways, a complete shipbuilding plant has been erected, and four steel ships of 8800 tons each are well under construction. It is expected that two of these will be launched about December 15.

A contract for eight such ships was awarded to the company by the United States Emergency Fleet Corporation about the middle of May, and all of the work has been accomplished since that date.

The company still has approximately forty acres of land not yet utilized, on which it contemplates more than doubling its present shipbuilding facilities, and constructing a 15,000-ton dry dock and repair facilities.

It is planned to add other storage facilities in the center of the pier in the open space in the foreground when commerce demands it, and to duplicate the wharf and freight shed on the east side of these warehouses. At present the City of Los Angeles is permitting a portion of these facilities to be used temporarily by the Navy Department, and the open space is utilized as a drill ground.

Two wooden shipbuilding plants are located on Slip 1. At the head of this channel is the Fulton Shipbuilding Company, which has recently completed the "Edna Christensen" and the "Lucinda Hanify," two vessels of about 1800 tons, which are reported to have been sold to the French Government. The Fulton company has contracts for four wooden vessels for the Emergency Fleet Corporation.

Municipal pier No. 1 ("Great Northern" at dock.).

On the east side of the Slip is located the Ralph J. Chandler Company, a new concern which has just started two wooden ships for the Emergency Fleet Corporation.

Further east is the Wilmington Basin opening off of the East Basin Channel. On this basin the City of Los Angeles has 1000 feet of municipal wharves, and a transit shed, known as the Water Street Shed, 630 feet long. At this writing there are also pending before the Los Angeles Harbor Commission four applications for sites for building wooden ships, awaiting action of Congress on the further proposed shipbuilding program of the Shipping Board. The Harbor Commission does not wish to tie this land up for building wooden ships unless assured that it will be immediately utilized, and therefore, at this writing it is awaiting action by Congress and the Shipping Board.

A number of other proposed companies also are seeking sites for shipbuilding, but are awaiting action by the Shipping Board before completing their plans.

The fishing industry has made great strides at Los Angeles in recent years. There are now approximately 500 boats engaged in fishing out of this port, going all the way from the Mexican boundary to far beyond the Channel Islands. The building of fishing boats and pleasure craft alone has become an important industry. The fishing industry has practically all developed in the last five years, and it has made especially rapid progress in the past eighteen months. It has developed along two lines, the shipment of fresh fish and the canning of tuna, of albicore, and sardines. For the fresh fish trade the City of Los Angeles has constructed a municipal fish wharf, with lockers and mooring accommodations for the fishing boats, and a wholesale market building 60 by 304 feet, two stories high, affording accommodations for fourteen wholesale buyers. They supply not only the Southwest with fish, but ship as far East as Chicago.

The tuna canning industry, however, has excelled the fresh fish business, and is one of the most remarkable developments of the California coast in recent years. Five years ago, when one or two canners began to put up the albicore commercially, only the white meat of the fish was utilized. It found a ready market, and more canneries were started. Today there are eight canneries in operation at Los Angeles Harbor and four more at Long Beach, five miles away. The market is greater than the canners can supply, not so much because of lack of canning facilities, but because the fishermen do not bring in the fish in sufficient volume. The fishing fleet is growing very rapidly, however, and a number of new canneries are either under way, or planned to be built, at the fish harbor.

The latter is a small harbor constructed by the city for the fishing industry. It is located on the ocean side of Terminal Island and consists of forty acres of water from ten to fourteen feet deep, enclosed on two sides by land and on the other two sides by a breakwater, except at the entrance. A wharf 1493 feet long extends across the north side of the harbor, and is backed by 65 acres of filled land, which has been set aside for leasing to fish canneries and allied industries.

Although the project has been completed only a few months, two canneries are now in operation there, two others are under construction, and sites have been obtained or applied for for four others. Boat building and other lines of business allied with fishing are located on the property.

The Board of Harbor Commissioners, which controls the entire harbor and operates all municipal harbor facilities for the City of Los Angeles, leases the waterfront ground to fish canneries for three cents a square foot per year. In fact, leases are made for all sorts of industries requiring waterfront sites at from one cent to six cents per square foot per year, depending upon the location and size of the area leased. Locations away from the waterfront are leased at a less rate.

One of the great features of the port from a transportation standpoint is the municipal belt line railroad.

The city has constructed more than seven miles of tracks serving all municipal wharves and all industries located on city tide lands. All railroads connecting with the municipal belt line are given the same switching rates in reaching the municipal harbor facilities and industries. The Southern Pacific, Salt Lake and Pacific Electric railroads already are utilizing the municipal belt line and the city facilities, and the Santa Fe is now planning a new twelve-mile line to make such a connection. The railroad receiving the line haul on any shipment absorbs the terminal or switching charge. A shipper over a municipal wharf, or an industry on city tidelands, thus has the benefit of access to all railroads without paying a switching charge.

As previously stated, the people of Los Angeles as a whole are not maritime in their tendencies. The great majority of them have come within recent years from interior regions. When they consider transportation, they think in terms of railroads rather than in terms of steamships.

They are just awakening to the importance and the benefit of water transportation. They are beginning to realize the tremendous possibilities of trading with their neighbors across the seas. They have come to the point where they are willing to spend millions of dollars in port terminals, but in no great numbers have they yet participated actively in the trade which those terminals open to them. The majority do not even yet realize that their harbor has placed them next door to Shanghai, and Singapore, and Melbourne, and Callao, but they are just now awakening to that fact. In other words, speaking in a large way, Los Angeles is just beginning to go after foreign trade.

Some firms have been shipping by water for several years, but not the majority.

Thus far the war has been a detriment, rather than a stimulus to the water commerce of Los Angeles; for it has taken away the ships which formerly carried a large coast-to-coast traffic between Los Angeles and the East, and these ships have been diverted principally to the trans-Atlantic trade. The shortage of ships also has interfered with much of the direct European trade which Los Angeles formerly enjoyed.

Yet in spite of this condition, the business of the port, both domestic and foreign, has largely increased, the latter chiefly with Latin America.

The rest of the country knows very little about Los Angeles as a seaport, any more than it does of Los Angeles as a manufacturing center. Los Angeles is usually known as a tourist city and because of its attractions as a place of residence, yet the latest census of manufacturers taken by the United States shows that Los Angeles is growing much more rapidly as a manufacturing city than any other large city in the western half of the United States. In fact, in the decade ending with 1914, the last figures available, the increase in number of wage earners in Los Angeles industries was approximately the same as the net increase in eight other important cities of the Rocky Mountain and Pacific Coast region combined. This statement is not made to disparage other communities, for some of them have grown very rapidly, industrially, but it is made to indicate the real situation. Even the people of Los Angeles do not realize this fact. But here are the figures as given by the United States Census of Manufacturers:

No. Wage Earners:	**1904**	**1914**	**Increase**
Los Angeles	10,424	23,744	13,320
Oakland	3,353	7,706	4,453
San Francisco	38,429	31,758	*6,671
Denver	9,672	11,062	1,390
Salt Lake City	2,776	4,913	2,137
Portland	8,171	11,273	3,102
Seattle	6,390	12,429	6,039
Spokane	2,428	3,020	592
Tacoma	4,457	6,765	2,308

*Decrease.

The "Finland" at Pier No. 1.

Main channel, inner harbor (Collier in stream.).

This tabulation shows that the increase of wage earners in Los Angeles was 13,320 in the ten years, while the net increase in the other eight cities was 13,350.

In a number of manufacturing establishments, and the increase in the decade, in these cities, the census figures are as follows:

Number of Industries

	1904	1914	Increase
Los Angeles	814	1,911	1,107
Oakland	248	573	325
San Francisco	2,251	2,334	83
Denver	722	885	163
Salt Lake City	192	366	174
Portland	437	837	400
Seattle	467	1,014	547
Spokane	188	277	89
Tacoma	236	339	103

Thus the increase in number of industries in Los Angeles was more than San Francisco, Portland and Seattle combined. Or, taking another combination, it was more than San Francisco, Oakland, Denver, Salt Lake City, Tacoma and Spokane combined, with 170 left over.

The Industrial Bureau of the Los Angeles Chamber of Commerce reports that 413 new industries have located in Los Angeles since 1914.

The value of the products turned out by Los Angeles' manufacturing establishments in 1904 was $34,814,000 and in 1914 it was $103,458,000, an increase of $68,644,000, which was almost as much as the combined increase of San Francisco, Oakland, Denver, Salt Lake City and Spokane in the same period.

These figures are cited merely to indicate that Los Angeles is coming forward as a manufacturing city.

The same growth, it is believed, is beginning in the water commerce of Los Angeles, and particularly with reference to its foreign trade. This commerce in the past has not been as large as the size and growth of the city would seem to justify, probably because the people of Los Angeles have been too busy trying to keep up with the growth of Southern California and its trade demands to go after outside business.

But now Los Angeles has come to the point where it is reaching out after world markets and world trade. It has carried its harbor development to the point where it now has the facilities to handle this trade. Those who have made a study of its situation believe that the same spirit and influences which have had much to do in making it the largest city in the western half of America, according to federal census estimates, and which have been largely responsible for its industrial growth, will now put it well to the front in developing the foreign trade of America.

The American Steamship Association, at its October meeting in New York, elected as members of its executive board some of the most prominent steamship executives in the United States. H. F. Alexander, president of the Pacific Steamship Company, was the Pacific Coast representative elected to the board.

The other new members are: P. A. S. Franklin, president of the International Mercantile Marine; H. H. Raymond, president of the Mallory Line; G. S. Dearborn, president of the American-Hawaiian Line; J. Howland Gardner, president of the New England Steamship Company; Franklin D. Mooney, president of the New York and Porto Rico Line, and W. H. Pleasants, president of the Savannah Line.

Municipal wholesale fish markets.

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CAPTAIN WILLIAM MATSON

ON October 11th death closed the career of Captain William Matson, perhaps the most commanding figure in the maritime history of the Pacific during the past quarter century. Captain Matson's career offers ample proof that hard and persistent work sometimes leads to results that read like a romance. Born in Sweden in 1849, William Matson started his seafaring career at the age of ten, at fourteen he landed in New York and in 1867 came around the Horn to San Francisco, taking up the calling of a sailor out of this port. After several cruises to Puget Sound he shipped on a Bay schooner and became a captain at the age of twenty-one. He built his first vessel in 1882 and placed her in the Hawaiian trade this craft proving the forerunner of a transportation fleet which can safely lay claim to being fully the equal of any similar trade line in the world.

In 1901 Captain Matson began to realize the great possibilities for the use of oil fuel both in stationary and marine power installations and in that year he made arrangements for the purchase of the forty mile pipe line of the Western Union Oil Company, together with a refinery and wharf at Gaviota and made arrangements also for the conversion into an oil carrier of his ship the "Marion Chilcott." It was his intention with that ship to transport fuel oil from Gaviota or from the port of San Francisco to the Hawaiian Islands, and for this purpose he erected storage tanks on a site at Alameda Point on Oakland creek. The oil was transported to this station in tank cars and from there loaded for shipment. In 1902 his first steamer, the "Enterprise," operating in the Hawaiian Islands trade, was converted into an oil burner and this was the first installation of its kind on the Pacific Ocean.

In this same year, Captain Matson purchased the United States transport "Rosecrans" and converted her into a tanker to secure further transportation facilities. By the year 1903 he began to realize that the cost of oil transportation by railroad cars was too high and determined on building a pipe-line from the Coalinga oil field to tidewater at Monterey, a distance of some 110 miles, and this pipe-line was completed in 1904. He purchased large quantities of oil from the producers throughout the district, transported it through the pipe-line to Monterey, and by means of the "Rosecrans" delivered the first fuel oil to Alaska, consisting of shipments to Dawson City, Nome and the Treadwell mines.

The sailing vessels of the Matson fleet, consisting of the "Monterey," "Rhoderick Dhu" and "Santiago," were quickly changed over to oil carriers, but this fleet, together with pipe-line interests and terminal stations, were sold to the Associated Oil Company in 1905 and became the nucleus of the present large transportation facilities of that concern.

Temporarily out of the oil business, Captain Matson turned his attention to the Hawaiian Island trade with renewed vigor and in 1908 added to his fleet the Welch line of sailing vessels at the same time adding to the capital of the company in order to keep pace with the growing demands of the commerce of the Islands which required larger carrying capacities and greater regularity of service than could be supplied with sailing vessels. The Spanish steamer "Gadiatano" was purchased and converted to an oil burner at Newport News and arrived at San Francisco, under the name of "Hilonian," to take her place in the Honolulu run a few days after the San Francisco earthquake. The "Falls of Clyde," one of the best known sailing ships on the Pacific and one of the widest known of the Matson fleet of sailers, was then sold to the Associated Oil Company, which concern converted the vessel into a tanker while the Matson company, gradually changing over from sail to steam, entered upon the extended building program which has resulted in the splendid fleet of today.

The first fruits of the new program, the steamer "Lurline," was delivered in March, 1908, and the "Wilhelmina" followed in December, 1909. In the meanwhile, the "Hyades" was chartered on a long time charter in 1908 and finally purchased outright in 1909, so that in this year the Matson fleet included, aside from sailing vessels, the

The late Captain William Matson, whose death on October eleventh was very keenly felt in Pacific Coast shipping circles. Captain Matson leaves a splendidly appointed steamship line as one of the monuments of his foresight and energy.

steamers "Hilonian," "Enterprise," "Lurline," "Wilhelmina" and "Hyades."

The success of this fleet was marked, but the business rapidly outgrew the capacity of these five vessels, and in 1912 the "Matsonia" was ordered with the "Manoa" only a few months later. The "Matsonia" proved such an economical and popular ship that, in 1915, the "Maui" was ordered, she being delivered and put in commission some six months ago. The "Maui" has the distinction of having the largest mercantile geared turbine installation of any vessel yet built in America and the result so far obtained more than justified Captain Matson's faith in the judgment of his marine engineering advisors.

Another innovation on the Pacific which must be credited to the Matson Navigation Company is the transportation of molasses in bulk. In 1910 a deep tank was built into the "Lurline" for this purpose and the same action was taken with the "Hyades" and "Wilhelmina." The "Maui," "Matsonia" and "Manoa" were fitted with special deep tanks for this purpose while building. In order to facilitate the shipment of molasses from the Islands, the United States gunboat "Bennington" was purchased in 1913 and converted into a molasses tow barge and the ship "Mohican" was treated in a like manner in 1915.

The rapid growth of the Matson oil burning fleet and the heavy demand for fuel oil in the Islands, practically forced Captain Matson into the oil business once more and in 1908 he became heavily interested in the Midway fields, his interests there being merged into the Honolulu Consolidated Oil Company. The production of the wells of this concern acted as an insurance of a future oil supply for the Matson Navigation Company and the Hawaiian industries with which Captain Matson was so closely identified.

In his active conduct of the affairs of the Matson Navigation Company, Captain Matson has ever evinced great loyalty to the best interests of the Hawaiian Islands. Realizing that a dependable supply of fuel oil was essential to the success of the Island plantations and industries, he had all his later ships constructed with very deep double bottoms making it possible to transport some 600,000 barrels of oil per annum to the Island ports in excess of the amount required for the round trips of the vessels. The value of this service is being fully realized by the industries of Hawaii in these days of shortage in regular tank steamer tonnage.

Captain Matson also took a deep interest in the commercial life and welfare of San Francisco, where he filled the office of Swedish Consul General for many years. As a member of the San Francisco Chamber of Commerce he held many important committee chairmanships, finally becoming president of that body. He was also actively identified with the Pacific Union, Bohemian and Commonwealth clubs. At the time of his death he was president of the Honolulu Consolidated Oil Company, the Commercial Petroleum Company and the Wonder Water Company and a director in the National Ice Company and the Honolulu Plantation Company.

While Captain Matson has been identified with many interests and has left his impress very strongly on the sugar raising industry of the Hawaiian Islands and on the oil industry of California, it is the great fleet of steamers which he labored so hard and long to secure and in which he took such a pardonable pride that will remain the chief monument to the memory of a man who practiced as well as he preached the doctrine of American ships for America's trade.

IN WASHINGTON

ONE of the most significant events at Washington during the past month was the final passage of House Bill (H. R. 5609) permitting foreign vessels to engage in coastwise trade during the life of the war under regulations to be made by the United States Shipping Board. The language of the bill is as follows:

"That during the present war and for a period of one hundred and twenty days thereafter the United States Shipping Board may, if in its judgment the interests of the United States require, suspend the present provisions of law and permit vessels of foreign registry, and foreign built vessels admitted to American registry under the Act of August 18, 1914, to engage in the coastwise trade of the United States: Provided that no such vessel shall engage in the coastwise trade except under a permit issued by the United States Shipping Board, which permit shall limit or define the scope of the trade and the time of such employment: Provided further, that in issuing permits the board shall give preference to vessels of foreign registry owned, leased or chartered by citizens of the United States or corporations thereof: And further provided, that the provisions of this Act shall not apply to the coastwise trade with Alaska or between Alaskan ports."

THE SHIPPING BOARD'S NEW MEMBER

CHARLES R. PAGE, of San Francisco, who has just assumed his duties in Washington, D. C., as a member of the Federal Shipping Board, comes from a family which has devoted itself to the shipping business and its allied activities as few American families of the present day and generation have done.

During the good old clipper ship days, when the American merchant flag dominated the seven seas, this common interest of a family in shipping activities was a characteristic of many New England households. The fact that such a tendency still exists and has been transplanted to the Pacific Coast, despite generations of discouragement, is a good omen among the other signs that augur well for the revival of the American merchant marine.

Mr. Page's father, the late Charles Page, for years was associated with Milton Andros in San Francisco in the practice of admiralty law, in which both won a wide reputation. The new Shipping Board member is a nephew of Arthur and George Page, prominent San Francisco shipbrokers, and he is a brother of Stanley H. Page, vice-president of the Union Gas Engine Company, of Oakland, manufacturers of marine engines.

Through his father, he is related to the famous Liljewalch family, owners of the Neptune Salvage Company, of Stockholm, probably the largest company of its kind in the world.

Mr. Page was born in San Francisco on May 24, 1878, which makes him forty years of age. It was natural that he should be encouraged to develop an early interest in maritime affairs. After graduating from Yale with the class of 1900, he shipped from New York as a member of the crew on the Arthur Sewall, of Bath, Me., a well known sailing vessel. This voyage took him to Yokohama and back, and it gave him an experience which undoubtedly will be of value to him as a member of the Shipping Board. Upon his return, he went to Europe, where he traveled extensively for the better part of a year.

Last year Mr. Page, in behalf of the Fireman's Fund Insurance Company, of which he was general auditor, made a careful trip of investigation along both the east and west coasts of South America. In view of our rapid trade development with South America, the knowledge of conditions and customs which he obtained on this trip should be a material asset.

Previous to becoming general auditor of the Firemen's Fund Insurance Company, Mr. Page for many years adjusted the marine losses for his company, and in this work he gained a thorough knowledge of the general principles of the shipping business. For the last ten years he has been chairman of the adjustment committee of the San Francisco Board of Marine Underwriters. He was also formerly president of the Association of Marine Underwriters.

In 1848 Mr. Page's grandfather moved with the members of his family, including Mr. Page's father, from the State of New Jersey to Valparaiso, Chile. It was in 1870 that the latter came to San Francisco to practice admiralty law. After settling here, his father married Miss Sally H. Myers, daughter of William F. Myers, who was then Quartermaster General of the United States Army. Mrs. Page still resides in San Francisco.

After traveling in Europe, Charles R. Page returned to San Francisco and entered the employ of the Fireman's Fund Insurance Company in 1902. Despite his college education and his extensive traveling, he began in the humble role of errand boy in order to learn the business from the ground up.

His marriage to Miss Louise Hoffacker, a niece of Mrs. Claus A. Spreckels, brought him in touch with another family that is extensively interested in shipping.

He is a member of the Republican party, but, like the average man of today, votes independently whenever the occasion seems to warrant. He registered as a Republican in 1912, but for local reasons in 1914 he registered Democratic. He was abroad during the election of 1916.

Mr. Page is fond of outdoor sports and is a great hiker and swimmer. According to his friends, he is by nature a student, and he possesses a most unassuming manner. He is a member of the Olympic Club and the San Francisco Commercial Club.

THE GEARED TURBINE

An outstanding feature in the marine engineering field of today is the favor with which the geared turbine is being received. This mode of marine drive has reached a point in its development where its reliability is unquestionable and this fact has added to the popularity which economy had already established. The largest mercantile drive of this character installed in the United States is that on the Matson Navigation Company's steamer "Maui" and we are given to understand that some exceptional results in the way of economy have been obtained on this vessel. As the number of engine room officers in our mercantile marine who have had experience with the geared turbine drive is steadily increasing, the economies incident to this type of machinery will increase and at the same time upkeep and repair costs will decrease so that we may expect the geared turbine to become a greater and greater factor in the propulsive equipment of the world's merchant fleets as time goes on. While the reciprocating steam engine will probably hold its own for years to come, it is evident that it has reached a point in development where no further large economies will be effected in its operation. Further economy in the steam generating plant will, of course, benefit any type of steam drive equally and it is also probable that superheat will adapt itself to the turbine as well as to the reciprocating engine. For these reasons a rapid increase of the geared turbine as a marine drive seems obvious.

INCREASING BERTH CAPACITY

ONE of the most significant local events of the past month was the acquisition on lease by the Union Iron Works Company of the old Risdon Iron Works property which adjoins the Potrero plant of that concern on the south. This property was purchased by the United States Steel Corporation in May, 1911, and was fitted up as a storage and distribution station. There is room on the waterfront of the property for eight additional slips and also for extension of the machine shop equipment of the present Union Iron Works plant. Following closely upon the heels of this announcement came the news of the formation of the Bethlehem Shipbuilding Corporation, a $12,500,000 concern which will act as a co-ordinating and holding concern for the Fore River Shipbuilding Corporation of Quincy, Mass.; the Harlan and Hollingsworth Corporation of Wilmington, Del.; the Sparrows Point Shipbuilding Company at Sparrows Point, Md.; the Samuel L. Moore and Sons Corporation of Elizabeth, N. J.; the Union Iron Works Company with yards in San Francisco and Alameda and the Union Iron Works Dry Dock Company with docks at Hunters Point. The stock of the new concern is all held by the Bethlehem Steel Company or its subsidiaries with the exception of qualifying stock for the directors. The president will be E. G. Grace; J. W. Powell, president of the Fore River Shipbuilding Corporation, will be a vice-president, and H. S. Snyder, vice-president of the Bethlehem Steel Corporation, will be a vice-president and have charge of the finanical end of the new corporation's activities. The main object sought is centralization of control, purchasing and accounting and practically no changes will be made in the present conduct of the units working under the new corporation.

GOVERNMENT CHARTER RATES

The United States Shipping Board has announced the rates upon which it proposes to requisition all American tonnage suitable for ocean service above 2500 tons dead-weight carrying capacity. The rates are as follows:

Cargo Boats and Tankers

Over 10,000 tons dead-weight capacity, Government Form Time Charter, $5.75 per dead-weight ton.

8001 to 10,000 tons dead-weight capacity, Government Form Time Charter, $6 per dead-weight ton.

6001 to 8000 tons dead-weight capacity, Government Form Time Charter, $6.25 per dead-weight ton.

4001 to 6000 tons dead-weight capacity, Government Form Time Charter, $6.50 per dead-weight ton.

3001 to 4000 tons dead-weight capacity, Government Form Time Charter, $6.75 per dead-weight ton.

2500 to 3000 tons dead-weight capacity, Government Form Time Charter, $7 per dead-weight ton.

Vessels of speed in excess of 11 knots to be allowed 50 cents per ton dead-weight per month for each knot or part of a knot over 11 knots.

For passenger steamers, the board adopted a two-fold basis of classification, Class A consisting of steamers with a capacity of over 150 passengers, and Class B consisting of steamers with a capacity of from 75 to 150 passengers. Steamers falling in both classes are further classified according to speed. The rates for passenger steamers are as follows:

Class A.

10 to 11 knots, Government Form Time Charter, $9.00 per ton gross register.

12 knots, Government Form Time Charter, $9.50 per ton gross register.

13 knots, Government Form Time Charter, $10.00 per ton gross register.

14 knots, Government Form Time Charter, $10.50 per ton gross register.

15 knots, Government Form Time Charter, $11.00 per ton gross register.

Over 15 knots, Government Form Time Charter, $11.50 per ton gross register.

Class B.

10 to 11 knots, Government Form Time Charter, $8.00 per ton gross register.

12 knots, Government Form Time Charter, $8.50 per ton gross register.

13 knots, Government Form Time Charter, $9.00 per ton gross register.

14 knots, Government Form Time Charter, $9.50 per ton gross register.

15 knots, Government Form Time Charter, $10.00 per ton gross register.

Over 15 knots, Government Form Time Charter, $10.50 per ton gross register.

"All the foregoing rates are tentative. The board will carefully examine the results of operation under the requisition rates, and from the results, as certified by expert examiners, will determine upon such revisions as fair and equitable treatment of the owners of the requisitioned vessels may require. Revisions will be made, if reasons therefor are found to exist, at intervals of not more than 90 days.

"As to insurance, the government will assume the war risk and in some instances the marine risk as well. In cases in which for any reason it is more convenient for the government to assume the marine risk, the usual rate for each insurance will be deducted from the charter hire."

The Port Authorities Convention

THE Pacific Coast Association of Port Authorities held its fourth annual meeting in Portland, Oregon, September 4 to 6, inclusive, with the following officers present: C. B. Moores, Chairman of the Commission of Public Docks, Portland, Oregon, President; C. M. Gordon, President of the Board of Harbor Commissioners. Los Angeles, First Vice-President, and G. B. Hegardt, Engineer and Secretary of the Commission of Public Docks, Portland, Oregon, Secretary. Officers not present were: S. McClay, member of Vancouver, B. C., Harbor Commission, Second Vice-President, and J. H. McCallum, member Board of State Harbor Commissioners, San Francisco, Third Vice-President.

Delegates were present from various port organizations from British Columbia to Los Angeles, and the meeting was one of the best attended and most successful so far held.

The meeting was opened with an address of welcome by George L. Baker, Mayor of Portland, and response by C. B. Moores, President of the Association.

Many valuable and interesting papers were read and fully discussed at the meeting. There were three papers on the subject of Port Belt Line Railroads: "The Belt Line Element of Port Terminals," by Judge C. E. Remsberg, member and Secretary of the Port Commission of Seattle; "The State Belt Railroad of San Francisco," by Frank G. White, Chief Engineer, Board of State Harbor Commissioners, San Francisco; and "Los Angeles' Solution of the Harbor Belt Line Railroad," by Clarence H. Matson, Secretary and Traffic Manager, Board of Harbor Commissioners, Los Angeles.

The wheat growers of the Inland Empire are rapidly discarding the use of sacks and going to the bulk handling method, and the ports of the Pacific Northwest are erecting elevators at tidewater to care for this changed system of handling and storing grain. Such terminal elevators have been provided at Seattle and Astoria, and Portland will soon have under construction a million-bushel grain elevator.

Mr. Hamilton Higday, Assistant Secretary and Traffic Manager of the Port of Seattle, read a very complete paper covering this important subject, and George F. Nicholson, Chief Engineer of the same public body, presented a paper on "The Trend of Modern Port Construction."

One of the most interesting and probably the most discussed paper presented at this meeting, was that by Colonel George A. Zinn, Corps of Engineers, U. S. A., on the "Commercial Value of Waterways" and this was followed by a very able paper on "Portland's Interior Water Service," by W. D. B. Dodson, Executive Secretary of the Portland Chamber of Commerce.

Mr. B. F. Stone, President of the Port of Astoria, spoke very entertainingly on the subject of "The Necessity of Ports," and Mr. E. J. Foreman, Assistant Traffic Manager of the Port of Seattle, read his paper on "Shipping after the War," which brought out a very spirited discussion. Mr. Foreman predicted such increases in commerce following the war as will more than justify the cargo port equipment investments made by all Coast cities.

The last formal paper of the meeting was that of Mr. J. O. Cameron of Victoria, B. C., on "Wooden Ship Building," which was an exceedingly interesting and well written presentation of the subject.

Brief addresses were made by R. R. Bartlett, Engineer of the Port of Astoria; F. W. Mulkey, formerly Chairman of the Portland Dock Commission; A. C. McNeil of the Grays Harbor Port Commission, and George M. Cornwall, Editor of "The Timberman."

As part of the program of the meeting, the delegates were given a trip over the famous Columbia River Highway and on the last day a tour of the harbor as guests of Colonol Zinn, U. S. Engineer.

Officers elected by the Pacific Coast Association of Port Authorities for the ensuing year were: President, C. M. Gordon, Los Angeles; Secretary, Clarence H. Matson, Los Angeles; First Vice-President, J. O. Cameron, Victoria, B. C., and Second Vice-President, B. F. Stone, Astoria. Place of meeting for 1918, Los Angeles.

Of the several resolutions adopted at this meeting, the following were the most important:

"Resolved. That the Secretary of this Convention be directed to transmit forthwith to the Cleveland Convention of American Port Authorities, copies of the several definitions of the term 'Port,' 'Port Terminal,' 'Belt Line,' etc., which have been formulated and presented to this Pacific Coast Association, and request that body to formulate and approve a comprehensive definition of such terms as a tentative standard throughout the United States and Canada."

Port: The land and water area and all improvements and facilities in a harbor for the handling, interchange and storing of freight and the embarking and disembarking of passengers.

Port Terminal: A meeting place at a port between land and water carriers for the transfer and interchange of freight and passengers.

Port Belt Line: That unit of a port comprising a system of railway tracks with all turnouts, switches, spurs, car barges and yards connecting and unifying industrial and commercial plants for the transfer and interchange of passenger and freight.

"Resolved, That the American Association of Port Authorities be requested to consider the problem of government control of ocean transportation rates, both coastwise and domestic, and transmit proper memorial to Congress petitioning for international agreements designed to prevent unfair practices, discriminations or extortions by ocean carriers of any nationality or in any service or trade route."

"Resolved, That it is the sense of this convention that at every port, all switching and terminal transfer of freights between railways and vessels, or vice versa, be performed by a single unified organization including barge or lighterage systems, and that port authorities and railawys be called upon to use every effort to increase port efficiency, eliminate duplication and waste of service, and establish uniform charges, whether the transfer service be under public or private control."

"Resolved, That this Convention most heartily indorses the Government policy of building wooden vessels to relieve the present shipping situation and most earnestly urges upon the Shipping Board the necessity of increasing this class of construction to the full capacity of the shipyards of the country."

On the following pages will be found abstracts of some of the papers delivered at this interesting convention.

Portland's Interior Water Service

By W. D. B. Dodson

Executive Secretary, Portland Chamber Commerce

(Abstract)

MORE than 2000 miles of navigable waters are found in the Columbia river and tributaries, yet we have a negligible interior water-borne commerce.

On the lower Columbia and Willamette this statement is not specifically accurate, as there is a heavy movement here of bulky commodities, the statement does apply with force, however, to the vast interior.

Why these waterways should be so little used is a serious problem. Several causes clearly contribute. No one cause removed would bring popularity to river transportation, but by attacking all, by planning years ahead, by co-ordinating forces, we believe that this river system will become the most potent influence for port development enjoyed by any Pacific Coast seaport. This statement does not mean that the river waterways will carry a majority of the commerce, but rather that the competitive influence of river transportation will command a development unappreciated today.

We feel that a new element is entering which must compel great things for the future. This is electric energy. Electricity generated by water power must soon become a national necessity. Fuel conditions forecast this. Canalization of the rivers, establishment of industries where power plants are erected, development of a demand for moving cheap raw material and making traffic available at the river banks will prove powerful incentives for the use of our interior waterways.

The 2136 miles of navigable water in the Columbia system are not all in one or even a few stretches. Except for the continuous 392 miles between the sea and the Priests Rapids and 170 miles of slightly intermittent navigation on the Snake river, the navigable portions of the system are frequently broken. In this case portage by rapids and unnecessarily handling quickly becomes prohibitive.

River rapids that may be passed by steamer are another serious cost factor requiring high powered vessel or a mechanical lift over obstructions. Canalization with lock lifts and long stretches of slack water will in time obviate this trouble.

The fact that a high percentage of our river system is in deep cuts is another serious traffic factor. If traffic was to be had on a minimum feed line haul, I am confident that much greater volume of river transportation would have been developed.

Absence of feed line systems between producing centers and the river, or the river and consuming points has been a vital weakness. Railways are naturally competitive with water. They can hardly be expected to make low rates on a short haul to a river trunk system. They are not often constructed so as to feed a river trunk, but rather parallel the line of movement along the river.

Another important consideration in reducing our river traffic has been the neglect of communities to provide adequate handling facilities. The river transportation companies have been lightly financed and could not do much along these lines. Communities have not risen to the need.

We still use the old style steamboat in a territory where fuel is high priced. Improved types of self-propelled barges, such as have been tried elsewhere, have not yet made their appearance on the Columbia.

To attain the most effective results, the following four cardinal developments are kept before the people:

1. Improvement of the type of river craft.
2. Organization of port districts along the navigable rivers for the construction of handling facilities and highway systems that will become feeders to the river trunk lines.
3. To organize trucking companies to operate between the river and main producing centers out to a distance of 50 or 60 miles, these constituting the feed system for the river trunk.

Such a system of course is most needed in the Columbia basin, where relatively little of the interior business is immediately on the river banks.

While a river may not maintain an effective transportation system, it yet may prove of the utmost importance as a rate regulator. This we believe has been the case here. A study of Portland's trade territory will convince any one that the influence of river transportation has worked to the immense advantage of producers and consumers of this region. Portland may serve something like 155,000 square miles of territory at a less rate from tidewater points than may be had from any other tidewater point of the Pacific.

Harbor view of Portland's municipal Dock No. 1. Length, 955 feet; width of dock shed, 100 feet; width of dock, including platform, 122 feet. Slip in foreground is 120 feet wide and 484 feet long, with 60-foot uncovered dock adjoining on the south.

Some are prone to argue that the interior waterway service has been a detriment rather than a benefit. Many of our leading men feel that railway managers prefer to develop a freight connection where there is not water competition. One of our greatest business men has often stated that we should either fill up the Columbia as far as navigation was concerned or use it to the maximum. I think it cannot be disputed, however, that we have a very important benefit from conditions made by the river and we also believe that the time will come when these advantages will be vastly greater.

A normal wheat crop for the three Pacific Northwestern States, Northern Idaho only included, is about 63,000,000 bushels. About 40,000,000 bushels of this has been sent to the export trade as wheat or flour. When this amount goes to export, at least 44,000,000 bushels of the total are produced within a 50 mile limit of the banks of the Columbia. If the feed line system outlined ever becomes effective, the river will become a growing factor every year in handling this export commodity.

I will submit some figures on the physical condition of the river system. From their study it is possible to realize some of the difficulties that have been experienced here in developing navigation on interior waterways and the work still to be accomplished.

The Columbia is 1200 miles long, of which 750 miles are in the United States. The Snake has a length of 1300 miles and enters the Columbia 324 miles from the ocean.

From the sea to the mouth of the Willamette, about 100 miles, the Columbia has a navigable depth of approximately 30 feet.

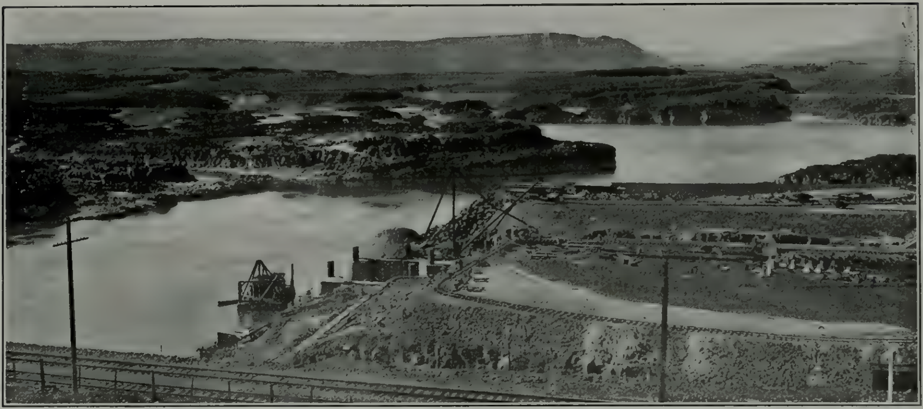
Some improvement work has been done between the mouth of the Willamette and Vancouver, five miles, and a depth of 22 feet has been obtained here.

From Vancouver to Bonneville, 40 miles, no improvement work has been done and the controlling depth is 8 feet.

Between Bonneville and the upper end of Cascade Rapids, 5 miles, the first large improvement project on the upper river was undertaken. Cascade locks was finished in 1896 and cost $4,000,000. There are two locks 96 feet wide and 466 feet long with 8 feet of water on the sills. The fall of river overcome is 24 feet in half a mile. There is a system of rapids below the locks with an eight-mile current at low water rising to a maximum recorded current of fifteen miles in time of freshet.

Between Cascade Locks and Three Mile Rapids, 45 miles, no improvement has been undertaken. The controlling depth is 8 feet.

Big Eddy, 3 miles beyond The Dalles, is the



Cross view of lower end of Celilo Canal showing Big Eddy into which boats emerge when leaving the canal.

lower end of the Celilo Canal, the most important single improvement yet undertaken in the upper river. (For description of this work see the Pacific Marine Review of July, 1915.)

Between the head of Celilo Falls and the mouth of the Snake, 124 miles, is a difference in elevation of 184 feet. The current in the strongest rapid is about 10 miles per hour at low water. The governing depth is 5 feet except Romily Rapids, where only 4½ feet is available.

Between the mouth of the Snake and Priest Rapids, 68 miles, the depth is 3 to 4 feet, channel conditions good, and Priest Rapids are passable in high water.

Between Priest Rapids and Arrowhead Landing, in British Columbia, 488 miles, 255 miles are easily navigable at favorable stages, 110 miles are navigable at considerable risk and only 11 miles are considered not navigable at all.

Between the mouth of the Snake river and Riparia on that stream, 167 miles, the controlling depth at lowest water is 2.5 feet. Three feet has generally been considered necessary for navigation, but boats have operated on this section drawing only 1.7 feet.

Between Riparia and Lewiston, 73 miles, the controlling depth at the lowest river stage is 4 feet.

Between Lewiston and Wild Goose Rapids, 30 miles, a channel depth of from 2 to 3 feet is available, and Ballard's landing, 80 miles above Lewiston, is reached frequently by small vessels.

Many tributaries of the Columbia, Snake and Willamette are navigable for short distances. Steamers have gone from Lewiston to Clear Water, 34 miles; the Yamhill river is navigated for about 5 miles; Cowlitz river for 19 miles, and Lewis river for 6 or 7 miles.

We feel that great benefits have been derived from river improvement. We feel that vastly greater benefits will come. We are committed to the policy of canalization and feel that the industrial development of the country and the improvement of transportation will in the near future compel the United States to adopt this policy.

Looking into the lower entrance of the Celilo Canal at Big Eddy. This waterway is the most important improvement on the upper Columbia river.

View of the new shipbuilding plant of the Foundation Company, Ltd., of British Columbia, at Victoria.

Wooden Shipbuilding

By J. O. Cameron

(Abstract)

MY remarks will be devoted to the building of wooden ships at Victoria, British Columbia. By way of preface, I should tell you that I have been engaged for many years in lumber manufacturing. A considerable portion of our output went overseas to various markets. If this great war had not happened with its attendant destruction of tonnage, I should never have thought of building any ship.

I need not remind you that commerce was paralized for many months after the breaking out of war; which condition seemed to be particularly depressing on the lumber business of British Columbia. The mills in which I am interested began receiving numerous requests for prices of lumber, cif, British, South African and Australian ports. We were no better off as we could not find ships to carry the lumber to its destination.

I decided that the lumber mills in British Columbia were rapidly approaching financial ruin unless some means could be found of transporting a considerable portion of their output to overseas markets. We inquired for ships that might be purchased or chartered, but offers received seemed altogether unreasonable although time has proven that we refused some great bargains. We began investigating the possibilities of building ships and were told by naval architects and shipbuilders that wooden ships were not worth considering. We found, on the other hand, that to establish a yard to build steel ships would require the investment of a large amount of capital and that steel was both high in price and uncertain in delivery. There was nothing further to consider except "wooden ships" or "no ships."

I remembered that the ships that carried the commerce of Britain and America to the four corners of the earth were all built of wood, that the first iron ship was not built until 1850 and the first steel vessel in 1880. I decided that if wooden ships had been useful throughout so many ages, they could still be made to serve a useful purpose. There were many great forests of suitable timber in British Columbia, plenty idle labor and saw mills, all but idle, to cut the timber. Nothing remained to be done but arrange for financing the enterprise and to find a man or men skilled in the all but forgotten art of building wooden ships.

In the fall of 1915, others who had been thinking along the same lines were quite willing to join in an agitation for government assistance. All public bodies in Victoria, including the Inner Harbor Association, went on record as being in favor of the government rendering a measure of assistance. The result was that an Act to Encourage Shipbuilding was passed in British Columbia and became a law on May 31, 1916. The main features of this law are:

1. To encourage the establishment of shipyards, the government offered to lend 55 per cent of the cost for a term of five years, to bear interest at 5 per cent per annum.

2. To lend on the security of the ships 55 per cent of the total cost thereof. The loan to bear interest at 5 per cent and be repayable in five equal payments. The ships to be built in British Columbia and to approved specifications.

3. Any ship so built, while operating in carrying B. C. products to foreign markets, was guaranteed a net earning of 15 per cent of her total cost. The

General view of the Cameron-Genoa Shipbuilders, Ltd., plant at Victoria, showing work under way.

subsidy period beginning one year after the end of the war and extending over 10 years.

Immediately after the enactment of this law, my associates in the saw mill business organized a shipbuilding company, the Cameron-Genoa Shipbuilders, Ltd. This industry owes its conception in B. C., largely to the efforts of Mr. R. T. Elliot, K. C., the President of the Genoa Bay Lumber Co., Ltd., and the enactment of the law encouraging this industry to Mr. R. B. Thompson, who was at that time a member of the B. C. Legislature and worked unceasingly for the measure until it became a law. He was then made Chairman of the Commission appointed to administer the act.

As soon as possible a site was secured on the Victoria Inner Harbor and three keels were laid in rapid succession.

Mr. J. H. Price of Portland, Oregon, who at that time was putting the finishing touches on the "City of Portland," was induced to come to British Columbia. His plans for the ships were adopted and he was charged with the supervision of the work. At his suggestion, Dean and Lloyd Johnson, were engaged to take charge of the actual work of installing buildings and machinery at the yard and of carrying on the construction. The Johnson brothers started work on June 15, 1916.

For more than a year previous to that date, our mills had operated at a loss and men tramped the streets looking for work. A few months later, several hundred men were employed in the shipyards, new logging camps had been opened up and our mills were operating to capacity.

The first ship, the "Margaret Haney," was launched February 3, 1917. Long before the launching she had been chartered to carry a cargo of lumber to Australia from B. C. mills. In rapid succession the ships "Laurel Whalen" and "Esquimalt" were launched and other keels laid in their places.

There are now on the ways at the Cameron-Genoa shipyards four ships, two being for the Imperial Munitions Board. These will be steam schooners. Mr. Price, President and General Manager of the Cameron-Genoa yard, advises that the company has undertaken to build four steam schooners for the British Government and has the option to build two more.

Another concern, the Foundation Co. of B. C., Ltd., has established a shipyard immediately adjoining the plant of the Cameron-Genoa Company. This concern began work about July 1, 1917. They now have three keels laid, devoting its energies entirely to ships for the British Government. I understand that contracts for twenty-five of the wooden steam schooners have been let to the shipyards in Victoria, Vancouver and New Westminster. These ships may not be as serviceable as if built of steel, nevertheless they will be of great use.

We have thoroughly demonstrated the utility of the wooden ship, and I believe it a duty, that Canadians and Americans alike on this Northwest Coast, owe to their countries generally and their own business in particular, to lend every assistance to the production of ships built of our native Douglas fir timber.

The Trend of Modern Port Construction

G. F. Nicholson, Chief Engineer for the Port of Seattle.

(Abstract)

CERTAIN general principles for the successful port of the first class have been formulated, such as deep and ample channels to the sea, which is an absolute requirement as is the accessibility to an extensive tributary country and a large producing and consuming population. Equally important is the proper location of the harbor line, and the establishment of public waterways, together with a waterfront marginal street and railways. These principles should be of first consideration as they form the foundation upon which is developed an efficient terminal and industrial system.

The modern port terminal should comprise not merely a group of well designed and equipped wharves, but not less essential it must have good warehouse provisions in close proximity to the transit shed for taking care of overflow cargo. In this group of warehouses should be found cold storage facilities in order to retain the perishable commodities until ready for market. Sufficient highway of access to and from the piers should be constructed for vehicular traffic and also land areas provided for the future location of industrial establishments near by the terminals from which they could expect to import their raw materials and export their surplus output at a minimum rehandling cost.

It is a well known fact that a general terminal plan without adequate railroad facilities is useless. It is most important that we have adequate railroad connections to and from the piers and car movement. Intimate physical relations between the railroads and the waterfront practically means a belt line. The day is past when any large shipper wants to be dependent on any single transportation company. The newly planned and constructed port arranged to take intensive advantage of its waterfront, with properly co-ordinated ship and rail terminal facilities, will be able to handle several

Whatcom Avenue warehouse and Stacey-Lander wharves and transit sheds, one of the units of Seattle's municipal harbor improvement scheme.

times the cargo in the same time that the older ports and would do it much more economically.

As to the modern freight depots we find the transit sheds and warehouses constructed at the present time are being made more fireproof. Sprinkler and fire alarm systems and fire walls are being installed, and fire hose and fire extinguishers are being used in a liberal manner. Since there is a tendency for ships to increase their freight carrying capacity the effect is to require wider piers and sheds of greater capacity. Heretofore transit sheds have been made too narrow for their length, and the engineer never seemed to relate the capacity of the shed with the ships making use of them. Assuming that the length and physical construction of a quay wharf is fixed by the length of the vessel it is to berth, a pier should have double the capacity, since a pier may be considered as two quays placed back to back.

The trend of modern port construction is to the wooden type of dock and the concrete warehouse. The public generally making a strong plea for concrete, and many engineers contend that it should be used, thereby making a more substantial and permanent structure. But wooden docks are being constructed, and even those that have built concrete docks have come back to the wooden docks. Port engineers have been sent on extensive trips to ascertain the best type of construction, and generally come back strongly convinced that wooden docks are the best. A thorough investigation was made before building the Port of Seattle's terminals, and timber wharves on creosoted pile foundations, carrying freight sheds of timber frame, with board walls, covered with corrugated iron, and wooden roofs, covered with tar and gravel or other fire retarding roofing, were decided upon. Wharves and transit sheds, such as have been built by the Port of Seattle, will have a life of probably twenty-five to thirty years, which is about the economically useful life of such a structure, while in that length of time a concrete dock may become obsolete. The creosoted foundation piles can always be replaced or changed at any time, as well as any other part of the dock, at a nominal expense. It has not been demonstrated that concrete, made of Portland Cement, is permanent in salt water. If it does not prove to be permanent, then the added cost is not in any way justified, and if it does prove permanent, then the physical life of the wharf would exceed its useful life, which is not economical. Another argument in favor of the cheaper creosoted pile and timber construction is that a given amount of money can be made to produce more terminal facilities than could be provided if the more expensive type of construction were adopted. In case of fire the loss to a timber dock would not be so great, and there would be some salvage, while in a concrete structure there would be scarcely any, and the cost of wrecking the latter would be expensive. No serious criticism has or can be well made of the use of the reinforced concrete fire proof warehouse construction in view of the resulting longer life, decreased maintenance repairs, fire hazard, and fire insurance over any type of timber construction. The warehouse is not subject to a radical change on account of mechanical freight handling as is the transit shed.

In reference to the mechanical handling of our freight we hear every day of severe criticism and dissatisfaction as to the continuation of the present wasteful method of handling freight at railway and steamship terminals in this country. When new terminals are designated and built in many cases the old methods are followed and transfer stations are being constructed daily without improvements for the economical handling of freight.

The day of the newer ports is at hand. Our older port cities, it is a notable fact, have been developed in an unscientific and uneconomical manner, and business has been conducted at them in spite of their wharf facilities rather than because of them. The terminal may have splendid modern up-to-date buildings, properly located, but unless it offers all the mechanical appliances, methods and facilities of the successful ports of the world it cannot reach its goal of ambition of a marine port terminal. A city can attract business by providing better facilities than those of older ports.

Reluctance to depart from the old and tried methods, together with the increased cost, seems to be a stumbling block to the introduction of improvements. In many instances new devices are received with suspicion, particularly by the operator, and are often not given a fair trial, while lack of study by the engineer of the necessities of the particular class of business often results in poorly planned installations. Also public port officials do not like to experiment with the tax payers' money.

The most efficient methods of handling all classes of freight at terminals are those which will relieve congestion, receive and deliver freight in the shortest time, pile it in the most compact and accessible manner, and reduce the amount of claims and the high cost of handling. A machine is yet to be built which will accomplish all these things. However, there are several machines, which, working together, are going a long way toward solving this problem. Among these are the electric tractors, industrial load carrying trucks and trailers, although conveying and piling machines, portable hoists and ramps should work hand in hand showing a saving in operating cost and giving greater speed and capacity. The advantage of the increased speed in handling is that a greater capacity can be had in a given area of dock space. There will also be less car congestion and naturally a decrease of car shortage. The principal cost of handling freight is the trucking of it about the pier. The hand truck, in almost every instance, can be substituted by an electric stevedore, which will carry a load of from four to twelve men more rapidly, more economically, and with less danger to freight.

Next in importance to the electric tractor is the electric freight elevator, which is indespensible in the warehouse and two-story transit. The modern waterfront freight elevator is not a stock elevator, but a specially constructed one, long and narrow, to accommodate the tractor and its trailers. It can be safely stated that the locomotive crane is a necessary piece of equipment for transferring freight in connection with the open wharf. A large capacity shear leg derrick is also a valuable piece of equipment for making heavy lifts.

Although the great bulk of freight in most European ports moved from the ship's hold to the pier, or vice versa, is done by the dock crane, this method has not been adopted by American ports mainly on account of the loss of time that must be experienced in locating the boom in the correct position. The general practice along the Atlantic Coast and in the newer pier installations on the Pacific is to provide what is known as "cargo masts" along the sides of the pier. This is more commonly knows as the "Burtoning System of Freight Handling," and is an exceedingly simple and effective method of handling cargo. It is very positive in its action for when one line only is carrying, the hook is directly in position over the hatch, and when the other line is carrying, the hook is directly over the door of the shed. There is no swinging of booms to be carefully gauged. There are several freight handling systems that will no doubt come into prominence on the Pacific Coast in the near future, and most probably will be given a thorough try out. Among these stand out the Sprague Adjustable Loop and Monorail System, with which almost every cubic foot of the shed below the roof beams can be utilized, and the Electric Whip Hoisting Apparatus, such as are being used in the large warehouses in the East. There is no question but that the time has come for a more extended use of economical cargo handling.

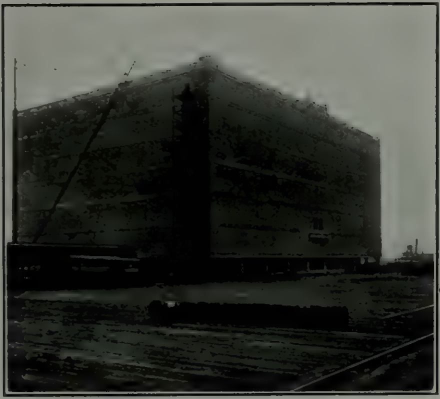
Smith's Cove gantry crane. Seattle has built a great wharf here half a mile long and specially fitted for the handling of lumber.

The Belt Line Element of Port Terminals

By Judge C. E. Remsberg

Secretary Seattle Port Commission

(Abstract)



Spokane Street fruit warehouse and Spokane Street wharf. Seattle owns a waterfront warehouse system.

THE purpose of associations of Port Authorities is to disseminate accurate information to the public as well as to exchange views among the members. Their primary purpose is to formulate public policies but second in importance is the defining of these policies in phraseology so accurate that the public cannot be misled by a subsidized press, nor can courts and executives misconstrue their meaning.

We have looked in vain for such a definition of such terms as "Port," "Port Terminal," "Belt Line," etc. What do we mean when we say the "Port of Seattle," the "New York Terminal" or the "New Orleans Belt Line?" By "Belt Line" do you mean a single track along the foreshore with turncuts and spurs to docks only, or, do you mean a correlating, co-ordinating system of yards, switches and spurs connecting and embracing all of the industrial and commercial units of the entire business community, controlled and operated by one head and that head the same that operates the "Port Terminal?"

Beforethispaper can be made intelligent we must have a common meaning of these terms.

The Seattle Commission asks you to urge upon the American Association that it appoint an aggressive committee who will during the coming year, not only analyze the elements, and define the scope of a "Port Terminal," but go before the Congress of the United States and the Parliament of Canada with a definite and practical program of action dealing with the problems of construction and operation, from public funds, of terminal facilities, including wharves, warehouses, grain elevators, cold storage plants and belt line railways and that such committee be given the authority and means of doing the same.

In support of the foregoing, let me point out:

First. The decided trend toward national ownership of railways, and the separating of operative control of American railroads under the pressure of war demands.

Second. The tendency toward nationalizing the Merchant Marine.

Third. The rapid spread of sentiment toward municipal ownership and operation of terminals; the inevitable result of the present chaotic conditions in ports which have grown up haphazard under private enterprise.

Mr. Ernest Loeb, former President of the Port Commission of New Orleans, defined "port facilities" as following:

"Waterfront terminals, including structures, reservations, equipment appliances and necessary collateral aids or conveniences for embarking and disembarking passengers and commodities transported to or to be transported by water. This would include specifically: wharves, piers, sheds, warehouses, railroads, water or street connections, belt railroads and yards, handling appliances."

In the San Francisco meeting of this Association we said:

"Analyzing the facilities in those ports (San Francisco and New Orleans), we find the following elements of service: First, public title to the foreshore; second, wharves and wharf sheds erected thereon at the water's edge for freight in transit; third, a public waterfront street; fourth, a public belt switching railroad co-ordinating the transfer of goods between rail and water and articulating the rail transportation companies and the water carriers through a disinterested public link or backbone. For term-storage of goods, however, they have depended upon private warehousing concerns.

"In that paper we discussed the absent warehouse or term-storage element in the much praised public ports of San Francisco and New Orleans, and pointed out that Seattle had taken the most advanced step in the provision of a public warehouse system."

At the Vancouver meeting of this Association, we discussed the "Port Terminal Railway" as an ideal to be achieved by constant expenditure of vigilance and vigor. The best North Sea ports are each in essence simply a series of railroad loops around the foreshore; and the fundamental principle of port organization everywhere is to arrange for marginal railroad and highway traffic in the rear of the docks that shall be as public and unimpeded in its movement as is the water traffic in front of them.

In Montreal, San Francisco and New Orleans, the "Belt Line Railroad" is an integral part of the public port system and serves impartially the freights which move by rail or by water or which is interchanged between rail and water carriers. At Seattle, the Port Commission for three years proceeded on the theory that the "belt line" was such an integral part of the port system, but during this year suit was instituted to enjoin the Commission from building such a belt line which was sustained by the Supreme Court of the State. Seattle is thus for the present deprived of this important link in its development.

The citizens of nearly every ambitious port are anxious to have a "municipal pier." Generally, the public gets no further than this idea. The "horrible example" is the great Municipal Pier in Chicago. It is a structure 3000 feet long, 290 feet wide, a freight shed on the main floor and passenger facilities on the second, with a 660 foot recreation building in the lakeward end—the whole having cost approximately $4,000,000. In effect, this great and architecturally beautiful municipal monument is an extension of the park system of Chicago. The freight space on the main floor is leased out to Lake Michigan steamship and excursion boat companies. A branch line of the private Chicago street car system makes an elevated loop around the inner court. No provision whatever is made for railway access, although railway freight spurs extend along the north bank of the Chicago river within three or four blocks. During the greater part of the year, this longest pier in America is utterly empty. Properly coordinated with the transportation system of Chicago, it could become literally a funnel for freights and of enormous service to the millions of Chicago residents.

Cities must learn that the ownership of a public plant is not sufficient—an aggressive operation is also necessary; and public operation of waterfront facilities cannot financially succeed until they are co-ordinated with the community's life.

In America outside of Seattle, public ownership of waterfront facilities does not mean public operation. In Seattle, on the public piers, the truckers, the checkers, the bill clerks, the elevator operators, the electric tractor men, the crane men, the weighers, the watchmen are all public employees. In the warehouses, in the fresh fish conditioning and storage plant, in the hay press, on the oil dock, on the marine ways and fishermen's net warehouses, the public employees perform all services and make all charges.

The President of the Commission has proposed the question of using some vacant ground near the elevator for the erection of a publically operated flour mill, and another tract for a public milk receiving and storage station. We sell ice to fish boats. We sell ice to shippers who express fresh halibut in refrigerator cars.

Section 5 of the "Port Commission's Public Terminal Warehouses No. A" provides a public selling plan whereby the Port of Seattle organization offers in connection with storage of goods of farmers, buyers, merchants, importers or shippers the opportunity of disposing of their goods to bidders who must submit sealed bids to be opened weekly, goods which the market agent of the Port Commission has written authority to sell.

Other ports also are moving out from the original idea of building one or more public docks, then sitting down to watch commerce grow. The State of Louisiana, at New Orleans, has built a great terminal cotton warehouse and a public grain elevator, to be operated by public employees. Montreal operates the public grain elevators, and other elevators are not leased out to private operators but are handled by public employees.

The development of terminal grain elevators and cold storage is growing in the public understanding and appreciation, but the need of public control of the transfer element at the port is poorly grasped.

If the public owned the foreshore along the waterfront, the development of a system of public piers and public warehouses, elevators and cold storage plants would be the merest incident of modern city planning, and a public belt line railway would certainly be a part of the equipment of the street, with spurs serving uniformly every pier or waterfront industry.

Grain elevator and Hanford Street transit shed. The Northwestern ports are rapidly acquiring public facilities for handling grain.

One analysis of a modern port has included the following elements:

(1) Transshipping terminals.
(2) Industrial terminals.
(3) City terminals.
(4) City railroad terminals.

In the first case, the province of the transshipment facility is to effect the transfer with the greatest dispatch and economy of through-freight ports.

The service of the port with respect to the industrial terminal is to transfer raw or finished products to industries engaged more or less in the manufacturing business. Theoretically, these terminals are on deep water frontage and directly accessible to ocean-going vessels. Practically, they may occupy large areas of cheap land, affording ample room for storage and expansion, providing belt line or lighterage service gives them access to rail trunk lines or ocean freight carriers with maximum dispatch and minimum cost.

The third port utility is the city terminal which bears the same relation to a seaport that the freight depot does to an interior town. It should embrace an organized terminal market, a storehouse for conservation of foods and industrial stocks. Its need of a public belt railway to radiate out supplies through the terminal to the interior portions of the community should be obvious.

The fourth class, the railroad terminal with barge transfer and interchange, embraces the terminal break-up, classification and storage yards of the railroads, interchange and team tracks, car ferry bridges, etc. If the railways remain private and the terminal becomes public, a twilight zone will result at this point. One of the problems of railroad valuation and rate control is just how far the railway should be permitted to capitalize terminal values as a basis for increasing their freight rates, and just how far the port community should insist upon the railways divorcing their trunk mileage from their freight terminals, so that the latter may become common property for the use of all carriers.

New York's publicly owned, but privately operated, piers are served by carts innumerable, and the cost of cartage is one of the wastes of American life. In time, the motor truck on hard surfaced arterial ways may achieve the efficiency of railway cars switched on steel rails. While the motor truck possesses greater mobility, it carries a smaller load and entails much heavier overhead than railway cars moved in trains in the terminal port.

Notwithstanding the hundreds of millions expended in New York for public piers, the congestion and cost of freight handling is intolerable. The best hope is that the railroads will combine through the American Terminals Corporation and perform some major port surgery. Spectacular changes of the magnitude required to make New York Harbor efficient would constitute an education of immense value to all other ports in America and the world.

Commercial Value of Waterways

By Col. George A. Zinn,
U. S. Corps of Engineers
(Abstract)

THE value of waterways for transportation is a subject that seems to have gained in importance during the past few years due to an increased demand for the transportation of supplies furnished by this country to European nations.

I cannot present an already accepted solution of the problem of determining the exact value of a given waterway for transportation purposes. I have endeavored to make an analytical solution of the problem and to develop a single general formula applicable to any given waterway for use in connection with the duty which has been assigned to the War Department by River and Harbor Acts of Congress and which duty has devolved upon engineers of the army; that is, of determining the advisability of improving certain specified waterways. I am not entirely satisfied that the formula completely covers the general case, or that I have reached that distant country known as the last analysis, so I will confine myself to the statement of a few ideas which have some relation to the problem, for until a correct solution has been reached we may expect a continuance of unwise enterprises and unprofitable investments in waterway and terminal improvements.

There are a number of ideas relating to the value of waterways as carriers which find ready acceptance among all classes of people and many other ideas which are not accepted by careful students of transportation questions. It is these borderland cases which interest us and which cause dispute between the extreme advocates of waterway improvement and those of railroad building. We must recognize that a waterway is but one of a number of methods of transportation, each of which under certain circumstances may be better or cheaper than the others, and again that a combination of several methods will be cheaper than any single one under the same conditions.

The solution involves a careful study of the various means of transportation, and of the various conditions under which transportation is to be effected. Not only is a study of physical conditions required to enable us to determine the commercial value of a waterway, but also a study of industrial, commercial and agricultural conditions.

It is generally accepted that the cost of transportation by vessel on an open quiet waterway is less than that by any other known method of transportation. When we depart from these simple conditions we must introduce into this statement so many modifications that it becomes very complicated. If the statement were universally true we should expect to see our natural waterways covered with vessels and never have parallel railways along their banks. Again, if it were true, we should expect to see artificial waterways constructed by private enterprise everywhere. Yet the canals of our early days have nearly all been abandoned and but one canal, that at Cape Cod, has been constructed in recent years by private capital. No one questions the value of the Suez Canal or of the canal at Sault St. Marie. But what is the commercial value of a Nicaragua canal and why should tunnels be constructed under the North river at New York?

The canals of the United States were profitable and valuable while their only competitor was wagon transportation. The receipts of the Erie Canal were sufficient to cancel its entire cost, but it is a disputed question whether the new Erie Canal will be of sufficient value to produce an adequate return on the investment.

During the early days of the United States, lines of travel followed the waterways and our growth and development were controlled by them. Simultaneously with the development of railway systems came a cessation in the development of canal systems and eventually the abandonment of many canals.

Many reasons are assigned for this result, and it appears to be true that the railroads which acquired possession of some of them did not find it profitable to maintain and operate them. The Lehigh and Delaware Canal appears to be the only one in the United States today operated by a railroad.

The competition between railway and water transportation lines continued for many years until practically all water transportation is now controlled in a greater or less degree by railroads. So long as this control exists, water transportation cannot develop along natural or economic lines and it is apparent that where waterways have a greater commercial value than railways an economic waste occurs.

Is there then any method by means of which we can determine the commercial value of a waterway, whether improved or unimproved? Surely there must be, otherwise all of our plans with respect to port development and river and harbor improvements must be founded upon haphazard guess.

In economics, transportation facilities are an element in the cost of production. Commodities will not be transported unless, as Professor Taussig says in his "Principles of Economics," there is brought about "a cheapening of the things transported because they are produced more advantageously at one place than another."

It follows, therefore, that a waterway has no commercial value unless some economic advantage arises from its use. Also that as between a waterway, a railway and other means of transportation, the waterway has little or no value unless it forms the cheapest method of transportation. The construction of improvements of a waterway is not justified unless it provides a method of transportation which is cheaper than all other existing means, or than any other system that can be constructed.

If the origin and destination of the commodity to be transported lie on a navigable waterway, and if the waterway is the shortest line between these points, it cannot be denied that a vessel will furnish the cheapest method of moving the commodity. If the construction of navigable waterways including the necessary freight handling facilities was always cheaper than the construction of other systems of transportation, then it would pay to construct such waterways to every point of the globe. Where the actual conditions vary from those just outlined, doubt exists as to the value of the waterway, and it is only in a few places and with a relatively small amount of traffic that such ideal conditions exist.

The great bulk of agricultural, mineral and manufactured products originate at points not located on naturally navigable waterways and are consumed at points equally inaccessible to waterways. In this journey from producer to consumer it may be true that they can be carried economically for part of the way on a navigable waterway, but in the greatest number of cases this will not be so. In the general case, at some portion of the journey, one of the three recognized methods of transportation, the wagon road, the railroad or the waterway, will be found to be more economical than the others.

We can readily see that the navigable waterways have a limited value. We must therefore study carefully, for the general case, the relative advantages and disadvantages of the several methods of transportation, and for each specific case, we must determine the best method of combining them.

A transportation system may be considered as composed of the freight carrier, the power that moves the carrier, the permanent way and the handling or terminal facilities. These four parts are the wagon, freight car or hull; the horse, the locomotive or marine machinery; the highway, the rails or the waterway and various forms of freight handling devices including warehouses and wharves. We can compare the cost of carrier per ton of capacity, the cost of power per ton per hour, the cost of permanent way per mile or per ton mile capacity and terminal facilities per ton hour and ton storage capacity. We can say in a general way in comparing rail and water transportation that the cost of vessel ton capacity is much less than car ton capacity, that the cost of vessel power per ton moved is much less than locomotive power, that the permanent way if it is a natural waterway costs nothing, but if it is a Panama Canal is enormously expensive. That the railroad track always costs something, and if it is a St. Lawrence bridge costs more than something, and that waterway terminal facilities are generally more expensive than rail.

If we know the cost of operation and cost of installation of each system and the cost of transfer from one system to another, we may in any given case determine which system or combination of systems will be the most economical. But it is only by means of careful investigation that we can determine the value of a given waterway. In this connection, I want to quote again from Professor Taussig:

"It follows from this obvious but often forgotten fact that a railway is not economically advantageous to the community unless it pays its way. This conclusion is not in accord with a common opinion. It is often said that a railway or other means of transportation may bring gains to the community, though it be not profitable to its owners. Similarly it is often argued that a government operating a railway, may accept with composure a financial loss, because the people as a whole have gained something that offsets such loss. The contrary-view seems the just one. No gain comes from carrying a thing from one place to another unless it can be

Views taken at the opening ceremonies on the Lake Washington Canal. This canal gives Seattle an inner fresh-water harbor and opens up practically unlimited waterfront for industrial development.

produced at the first place so much more cheaply that it can afford the cost of carriage to the second. Ability to stand the transportation charge is the test of the utility of the carriage.

"It will sometimes be of advantage to open up a new country or a new region, by railways (and the argument applies equally to wagon roads; canals, steamship lines) which do not pay at the outset. This case is analogous to that of protection for young industries. Eventually the railway should pay; if the losses of the early stages are not recouped they are definite losses. It follows that where subsidies are given to encourage railroad construction, they should be in the nature of loans, to be reimbursed when the stage of profitable operation has been reached."

The theory which I have drawn from my study of the problem is first, that the value of a waterway can be established only through an investigation of the industrial, commercial and transportation conditions of the territory adjacent to or within the influence of the waterway, the physical characteristics of the waterway and adjacent territory, and a determination of the probable amount of traffic which will move on the waterway, and second that the measure of value consists of two parts, the first of which is that a transportation line operating an economical type of vessel will receive a gross income sufficient to give an adequate return upon its capital expenditure, and the second that the cost of transportation upon the waterway considered by itself and in connection with connecting land and water lines of transportation will be less than that of existing transportation lines or of any other form or system of transportation lines that might be installed in the same territory.

The task assigned to the Waterways Commission is far from being a small one, and it may be hoped that as a result of its labors we shall have an authoritative statement in great detail of the principles to be followed and the means to be employed in ascertaining the commercial value of waterways.

Los Angeles' Solution of Municipal Belt-Line Problem

By Clarence R. Matson

Secretary and Traffic Manager, Los Angeles Board of Harbor Commissioners

(Abstract)

WHEN Los Angeles began the construction of its first municipal wharf in 1912, it had undisputed title to very little waterfront. In the inner harbor, where this wharf was built, it had dredged a channel through mud flats and reclaimed thirty-seven acres of land which it owned in fee. A public street also paralleled the waterfront in another location and the city proposed to construct a municipal wharf along this street.

Adjacent to these locations was the main line of the Southern Pacific railroad, the only road which could reach them advantageously. With the preparation for building these wharves came the question of railroad connection to bring in materials, and the harbor engineer approached the Southern Pacific with reference to the problem.

The Southern Pacific submitted a proposition as follows: The city would construct the necessary spurs and the company would switch cars to and from them and not charge the city.

At that time there was in vogue in Los Angeles and San Francisco a switching charge of $2.50 a car which the railroad imposed for delivering or taking cars from private tracks. This charge afterward was abolished by the Interstate Commerce Commission, but at that time the charge was recognized as legal. The proposition of the Southern Pacific, therefore, was that city spurs should be considered the same as industrial spurs, except that the railroad would not enforce the usual switching charge.

The writer prepared a protest against the proposition, pointing out that the tracks it proposed to construct would be the beginning of a municipal harbor belt line, and as such, the city was entitled to a return on its investment. To meet the emergency for construction purposes, however, the contractor was allowed to put in a track connected with the Southern Pacific—for construction purposes only—and the railroad was allowed to use the spur for switching construction material.

Before the wharf was completed, the American-Hawaiian Company asked for a berthing permit covering the wharf, and it was necessary to make permanent rail connections. In the meanwhile the city had been conducting negotiations with the Southern Pacific and Pacific Electric companies with a view to taking over their complete harbor terminals; but this plan came to naught.

About this time the American-Hawaiian completed its plans for using the municipal wharf. The Southern Pacific and the city were anxious that the steamship company should have adequate service, and, finally, the railroad signed an agreement whereby it agreed to serve the steamship company on the city's tracks, paying the city at the rate of 5 per cent per year on the cost of the tracks and the value of the land actually occupied by the tracks. The agreeemnt permitted either party to terminate it upon ninety days' notice.

The permit continued two years, when the city terminated it. An agreement has been reached that the land occupied shall be valued at $1.00 a square foot, so that the revenue to the city amounts to $5,500 a year for the tracks serving one wharf.

About two years ago the first of the municipal piers in the outer harbor began to approach completion, together with two miles of municipal tracks. This district was separated from the inner harbor by two miles, but the divisions are connected by the main line of the Pacific Electric railway, which passes over an expensive drawbridge.

When the project to form a common terminal fell through, an inquiry was made of the president of the Pacific Electric if he would consider a joint traffic arrangement whereby the city might move its traffic over the Pacific Electric drawbridge and two miles of main-line track. To this he assented and the result was a document which amounts to an operating agreement. It was worked out in the following way:

A revocable permit was granted the Pacific Electric Company to switch its cars over city rails, paying the city for this privilege. The switching rate was fixed at $2.50, which was split 40 per cent to the city for use of the tracks and occupied property and 60 per cent to the railway for the use of equipment, operating expenses, etc. This gave the city a net remuneration of $1.00 per revenue car.

As additional remuneration for the permit, the Pacific Electric agreed to handle cars of any other railroad between points that the Harbor Commissioners might require. As movements between the inner and outer harbor involved the use of two switching yards and the use of the connecting Pacific Electric tracks, a switching charge of $5.00 was fixed, which was split 80 per cent to the railroad and 20 per cent to the city, the latter still receiving $1.00 per revenue car.

Where rail and water meet at Los Angeles, Cal. The people of Los Angeles are rapidly developing the publicly controlled sections of their waterfront.

The Pacific Electric further agreed that there would be no discrimination in rates against the municipal wharves.

The City of Los Angeles therefore established the following principles: That municipal wharves shall be on a par with competing railroad wharves in rates and service; that municipal rails shall be considered as a belt-line railroad and entitled to a portion of the line haul revenue; that municipal facilities shall be open to all railroads on equal terms, allowing new lines to build to the harbor and allowing shippers a choice in routing freight.

This arrangement also established a connection between the inner and outer harbors without the necessity of condemning a right-of-way through a valuable district and building an expensive railroad line and drawbridge. The arrangement is revocable by either party on one year's notice.

By this plan of co-operation it has also been possible to do away with a vast amount of litigation and disputes over titles.

By tideland litigation the public came into possession of several hundred acres of very valuable lands around the waterfront. About 200 acres were left with the title so clouded that while the fee title was vested in the private claimants, the city had the right to take it at any time for navigation, fisheries and commerce. The private claimants could find no one who would use it industrially, and the city could not use it until the demands of commerce made it necessary.

After long negotiations, the private claimants deeded their fee to the city, receiving in return a lease for thirty years on an equal area, but reserving the waterfront for public use. This made possible the development of 200 acres industrially, the city reserving the right to lay municipal beltline rails on any of the property.

The city has for several years been working for the construction of a wide boulevard from the city proper through the business section of San Pedro to the Outer Harbor. Years ago condemnation suits were brought for necessary rights-of-way, and the road has been completed except for ten blocks where the condemnation proceedings took in the entire Pacific Electric right-of-way and a portion of the Southern Pacific yards. The railroad companies made a claim for $22,000,000 for damages.

The original plan was for a 130-foot roadway to accommodate both motor trucks and a municipal railroad. Owing to the agreement with the Pacific Electric, the right-of-way for the railroad tracks was eliminated. This also made it possible to carry the motor truck road up a grade and along the side of a hill 25 feet above the railroad yards, and, at the southerly end, to cross the yards on a viaduct.

In litigation the city came into possession of the right-of-way occupied by the main line of the Pacific Electric Company across a section of tidelands. The city had no desire to put the railway off this right-of-way. An agreement was entered into by which the railroad companies gave the city a thirty-year lease for the land needed for its harbor boulevard, and the city in return gave the Pacific Electric Company a like lease on its right-of-way across tidelands.

Thus the city obtained without the payment of a dollar, and without litigation, what otherwise would have cost an immense sum, and avoided years of delay.

By no means the least result of the city's working out of the belt-line problem has been that the railroads are now all working in harmony with the city to build up the port and its trade, and we are finding the railroad officials fair in their dealings while faithful to their own trusts.

LAUNCH OF THE "GENERAL DE CASTELNAU"

"Le bapteme a'ete complet. Il oura d'heureux et longs voyages pour la service de la France et des' Allies. Vive la France; Viva les Etats Unis!"

This sentiment, voiced by a daughter of France, accompanied the baptism of the steamer "General de Castelnau," launched on October 5 from the lower yard of the Baltimore Dry Docks and Shipbuilding Company for the Compagnie Generale Transatlantique, as one of the units of the Emergency Fleet Corporation.

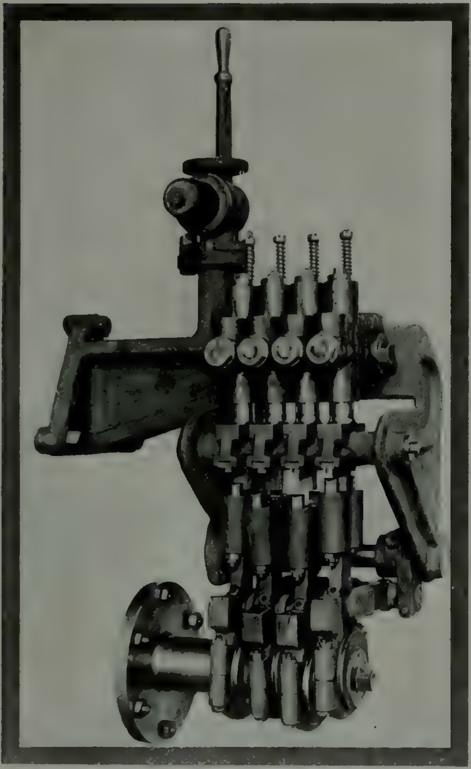
It was France's day at the works and recorded the first event when the sister republic paid official tribute to a vessel built in an American shipyard.

Madame Lacombe, wife of Captain Francois Lacombe, attached to the French Legation at Washington, christened the vessel with French wine.

The "General de Castelnau," named after a French officer fighting somewhere against the Huns, is a freighter 353 feet long, 49 feet beam, and 28 feet 6 inches molded depth, and has a deadweight capacity of 6200 tons. She is driven by steam turbines of 1800 shaft-horsepower, steam being furnished by three Scotch marine boilers, each 12 feet 9 inches in diameter by 11 feet 3 inches long and working at 200 pounds pressure. The vessel is built to Lloyds highest class.

The "General de Castelnau" was the first vessel to be launched at Baltimore for the Emergency Fleet Corporation. She was contracted for with the Compagnie Generale Transatlantique of Havre, France, and is one of eight vessels under contract at this yard which have been commandeered by the United States Government. The launching was witnessed by a distinguished party from Washington which included members of the High Commission of the French Republic.

A New Marine Oil Engine



The arrangement of the valve-gear eccentrics in the heavy-oil engine designed by Mr. Carl Engle.

A NEW type direct reversible marine oil engine (16"x24"-3-cylinder) has just been completed at the Lander street plant of the Seattle Machine Works. The designer, Mr. Carl Engle, who was engaged by the Seattle Machine Works about a year ago, has been actively engaged in internal combustion engine construction for over nineteen years and his practical experience in that line as superintendent in a large Eastern manufacturing plant has made it possible for him to work out an entirely new design of engine, not only eliminating all unnecessary complicated parts but also embodying new improvements which are important to a successful running oil engine. It has been the designer's endeavor to build a simple, accessible and easily operated engine, made fool proof; with liberal strength and dimensions, and constructed to stand up under all conditions. It operates on fuel oil or any oil that is suitable for oil engines. It is direct reversible with compressed air. The reversing mechanism is a new invention (patent on which has been applied for) and has already been installed by the Seattle Machine Works on several Eastern engines. They now have orders for four more reverse mechanism installations.

Following is a brief description of this oil engine:

The castings for cylinders and pistons are made of a special mixture of close-grained cast iron. The cylinders and cylinder-heads are tested separately under hydraulic pressure. All opening on cylinder or crank case are covered with flanges and are placed in, such a position that these can be readily removed without trouble. The cylinders are water jacketed and have ample water circulation from a pump which is operated from the main shaft.

The crank bed plate is cast in one piece, and is constructed to take care of the crank shaft and bearings in itself so that the whole top of the engine can be easily removed without disturbing the shaft or main bearings. The strength and construction of the crank bed plate make it almost impossible to draw same out of line and cause hot bearings. It has, furthermore, sufficient rigidity to eliminate any possibility of its working loose from its foundations providing these are made in proportion to the size and strength of the crank bed plate.

The crank shafts are made out of high-carbon open-hearth steel, and are made over-size to Lloyds' requirements.

The dimensions of crank pins and main bearings are such as to obtain a very large bearing surface so that the pressure per square inch is low enough to keep the bearings cool under any load which the engine may carry.

Each cylinder has an individual fuel oil pump of the simple plunger type with self contained ball checks. The centrifugal force of the governor weights is impacted to the sliding device which is connected to all the rocking bell cranks for the fuel injection pump. This is operated by eccentrics on the main shaft on which the sliding device is working in such a manner as to cause a long or short stroke of the injection pump. According to the load the displacement of fuel is in direct proportion to this variable stroke.

The governor is of the centrifugal balanced type, is not affected by the rolling of the ship, is driven directly from the main shaft and in conjunction with the plunger of each pump through the sliding arrangement before mentioned regulates the amount of oil injected according to speed and load of the engine. In any case of emergency in which the loss of a propeller or the breaking of the shaft would raise the engine a few revolutions above its normal speed the increased centrifugal force on the governor weights will stop the engine and thus avoid more damage.

The Engel air distributing valve with which this engine is equipped can also be attached to any marine oil engine for direct reversible purposes. The valves are in motion only when starting and reversing the engine so that there is no wear on any part connected with them while the engine is in operation. The same eccentrics which operate the fuel injection pump also operate the air distributing valves.

When the reversing lever is pushed out of its neutral position in either direction it will immediately shorten the stroke of the injection pump and at the same time the air distributor will start to open according to the time set for each cylinder, which will receive the full volume of air required for the engine. When the lever is put back to the center of quadrant the oil injection pump will resume its full stroke and the engine will take the full amount of fuel oil required according to the speed and load as regulated by the governor.

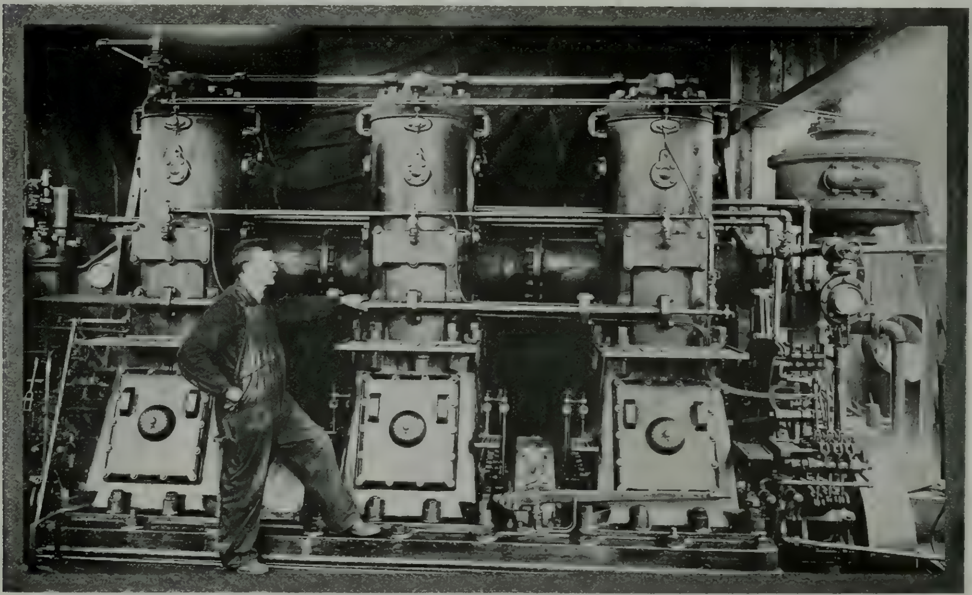
This engine has no lubricator or force feeder requiring a lot of copper tubes leading to the cylinders, bearings and other working parts such as are usual on other oil engines. The lubricating system is very simple in construction. A plunger type pump which is always in operation with the engine takes care of the lubricating oil which is forced through a pipe and remains under a certain pressure against sight feed valves which are attached to all the main bearings. The pressure of lubricating oil is regulated by a by-pass according to the amount of oil required for each bearing. The pressure of oil is indicated by a guage.

There are no lubricating oil pipes attached to the cylinders as the piston itself carries the oil required for its own lubrication. Crank pin, wrist pin, cylinder and piston receive their lubricating oil through a plunger pump attached to the inner wall of each crank case and this, also, is regulated by a single sight feed valve which is connected with the same pipe from which all the other bearings receive their oil.

This type of engine is built from 75 to 500 b.h.p.

The inclosure of the crank case does away with all danger to inexperienced attendants. The rigidity of the main crankshaft bearings and the slightest leakage past the piston, which is often noticeable in open crankcases, has been entirely and permanently overcome on this engine by passing a charge of pure air unmixed with fuel oil through disc valves into the crank case. This air is compressed by the downward stroke of the piston which allows it to pass into the combustion space.

In order to prove complete and perfect assembling and developing of power as rated, a test has been made covering a period of approximately three months. The fuel-oil consumption shows at a brake test of 250 hp., with a speed of 180 r.p.m., seven-tenths of a pound per horsepower per hour. During the test the engine was subjected to an overload of 15 per cent, the 16-inch bore by 24-inch stroke giving a piston speed of 720 feet per minute.



View of a three-cylinder "Engle" heavy-oil engine recently completed and given a series of exhaustive tests at the plant of the Seattle Machine Works.

Work under way at the plant of the Rolph Shipbuilding Company, Eu eka, California.

Around San Francisco Bay

THE steamer "Adeline Smith" of the C. A. Smith Lumber Company's fleet was sold to the Robert Dollar Steamship Company in the closing week of September.

Another well known coast vessel to change hands was the "Paraiso," which has been purchased by Oliver J. Olson. The "Paraiso" was built at Long Beach by the Craig Shipbuilding Company in 1912 and she is 216 feet 6 inches long, 40 feet 2 inches beam and 13 feet 1 inch depth of hold and has a lumber capacity of about 1,100,000 feet.

The South American Pacific Line, formerly under the control of C. Henry Smith, Inc., which concern operated it for three years, is now managed by Mr. B. Lindvig, son of the owner of the fleet, Mr. A. O. Lindvig of Kristiania, Norway. The senior Mr. Lindvig is now the President of the Norwegian Shipping Association in Kristiania and was formerly Minister of Commerce in the Norwegian Cabinet. The Pacific Fleet under the management of Mr. B. Lindvig with offices at 280 Battery street, San Francisco, consists of the steamers "Regulus," "Baja California," "Sinaloa" and "Governor Forbes" while a fifth freighter is building at the Union Iron Works. This fleet plies between San Francisco and Puget Sound ports on the North and Mexico, Central America, Columbia, Peruvian and Chilean ports on the South.

At the annual meeting of the Shippers' Association of the Pacific Coast held in San Francisco, October 4th, Mr. James Tyson of the Charles Nelson Company was elected President; Charles R. McCormick, vice-president; William R. Sullivan was re-elected secretary-treasurer and attorney and Arthur Cahill of Sudden and Christenson, Andrew A. Moran of Fair and Moran and S. S. Freeman were elected directors.

During the past month the W. F. Stone yard at Oakland launched two of the power copra schooners building to the order of the Burns-Philip Corporation of Sydney, Australia. These vessels are 117 by 28 by 11 feet molded dimensions and will be driven by 110 horse power Union gas engine.

The boilers which were salvaged from the wrecked steamer "Bear" will be shipped to Shanghai, having been sold to a Chinese shipping concern.

The Ocean Transport Company, a new Japanese steamship concern of Kobe, Japan, have opened San Francisco offices in the Clunie building. Mitsui and Company will act as general agents and Mr. Drew Chidester is named as resident agent.

Dickerson and Gaskill, freight brokers, insurance and forwarding agents, have opened San Francisco offices at 210 California street with William A. McKee as district manager. This concern has offices in Boston, New York and Chicago.

Mr. Frank J. Trist, a well known San Francisco marine engineer with the Associated Oil Company died in his home at Burlingame, Cal., on October 10th.

THE MOTORSHIP "GRAYS HARBOR"

A great deal of interest was displayed in the big motorship "Grays Harbor" on her recent visit to San Francisco. The "Grays Harbor" is virtually a sister ship to the M. S. "Santino" and like her is fitted with a pair of 400 b.h.p. Sumner engines. A complete description of this machinery will be found in the May, 1917, issue of the Pacific Marine Review. Mr. H. W. Sumner, the designer of the engine that bears his name, accompanied the "Santino" on her first voyage to New York and the refinements suggested by that vessel's performance, both as to motive power and hull, have been embodied in the later hull and engines. The engines of the "Grays Harbor" are four-cylinder, single acting, two-cycle and of what is known as the "surface-ignition" type. They operate on a low compression, approximately 140 pounds. The engines were constructed at the plant of the Marine Pipe and Machine Works, Seattle. Chief Engineer J. P. Browner states that these engines operated smoothly and without trouble during the trip down from the North and that he expected no trouble with them on the run to New York.

The hull of the "Grays Harbor" was constructed at the Schubach yards, Aberdeen, Wash., and the vessel is 296 feet long over all, 48 feet beam and 26 feet depth of hold. She is owned by Gaston, Williams and Wigmore of New York and after delivering her lumber cargo at a West Coast port she will load nitrate for New York. She is being taken around by Captain E. A. Greene.

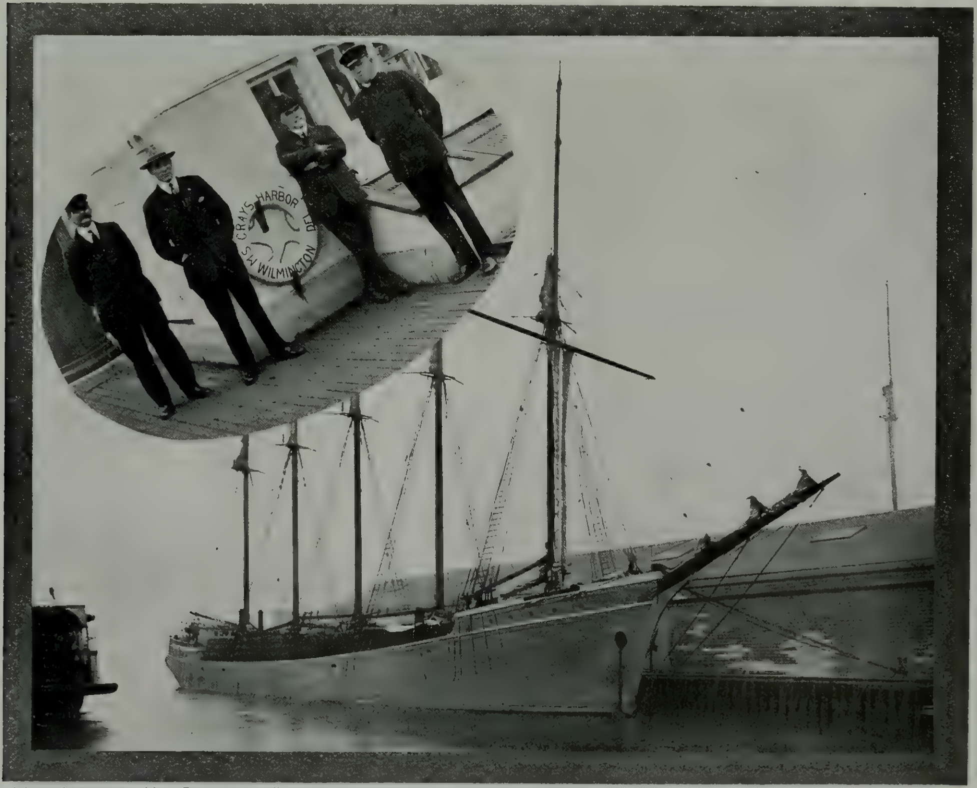
The "Grays Harbor" is rigged as a five-masted topmast schooner with cargo booms on the fore, mizzen and spanker masts. The donkey boiler, which supplies steam to the winches, windlasses and capstans, is located in a deck structure just aft of the main mast, this structure also housing the carpenter shop. The windlass is located on the forecastle head while aft on the poop deck is a 10 h.p. electric winch for handling the sails. The vessel is electric lighted throughout. The forecastle is equipped with special separate sleeping quarters, mess room, shower baths, etc. The officers quarters are aft in the poop and are very comfortable.

The "Grays Harbor" loads about 2,000,000 feet of lumber, the cargo booms being unshipped and stowed when loading is completed. There are five steam cargo winches giving the vessel the same dispatch in handling cargo as a steam schooner.

The fuel oil capacity is 1620 barrels, carried in special tanks between decks and provision is made for pumping from one tank to another in order to trim ship.

The performance of this very large lumber carrier and her sister ship is being closely watched by the marine interests and the further career of these two ships will give an excellent basis upon which to help forecast the future of this type of vessel.

Captain Greene reports that on the trip down from the North he logged as high as 10½ miles an hour which is an excellent performance for such a heavily loaded craft. The interests of the "Grays Harbor" at this port are being looked after by Mr. J. C. H. Ferguson, Coast representative of Gaston, Williams and Wigmore.



View of the motorship "Grays Harbor" taken during the recent stop of that vessel at San Francisco while on her maiden voyage to New York. In the insert, reading from left to right, are Chief Officer Nelson; Captain E. A. Greene; Mr. J. C. H. Ferguson, agent for the vessel's owners, Gaston, Williams & Wigmore of New York, and Chief Engineer J. P. Browner, who has charge of the 400-b.h.p. Sumner engines on the "Grays Harbor."

The Month in Seattle

WHAT is conceded to be the first full powered ocean-going motorship ever launched in the United States, the 2400-ton wooden hulled M.S. "Oregon," is nearing completion at Pier No. 8, the terminal of the Pacific Net and Twine Company. The "Oregon" was built by the West Waterbury plant of the Alaska Pacific Navigation Company, and launched in February of this year, and has been kept waiting for the delivery of her engines, that under contract should have been delivered in December last year. The first engine, however, did not arrive until August, and the second was delivered last month. The installation of the second is now about completed, and after a few finishing touches the vessel will be given her trial run.

The delay in deliveries was one of the results of stringent war period conditions, and it furnishes a good example of the problem that has been faced the last year by the shipbuilder in obtaining the machinery for auxiliary-powered vessels.

The "Oregon" has been equipped with a pair of 625-horsepower full Diesel Southwark-Harris engines, giving a total horsepower of 1250, which will drive her along at an average speed of ten knots. Her length is 234 feet, deadweight capacity 2400 tons, and she is capable of carrying close to 1,500,000 feet of lumber.

The "Oregon" is of exceptionally stout construction, and her accommodations for passengers are all that could be desired. She has accommodations for 100 passengers, including forty first-class. The staterooms are all large and handsomely appointed, and all the quarters in the vessel are heated and lighted by electricity.

Whether the "Oregon" is actually the first ocean-going motorship to be built under the American flag has not yet been fully determined, but from present indications she can claim that distinction. Search of the records so far has failed to disclose any predecessor of her type built under the Stars and Stripes. Thus Seattle's wooden shipbuilding industry apparently has brought a new honor to the Elliott Bay waterfront.

"Great Northern" and "Northern Pacific"

The former Hill liners "Great Northern" and "Northern Pacific" are now at the Bremerton Navy Yard undergoing the necessary alterations to fit them for their part in this grim conflict in which the United States is now engaged. These vessels, popularly known as the "Twin Palaces of the Pacific," are being stripped of their beautiful woodwork partitions and paneling and costly decorations that have distinguished them as the most beautifully appointed vessels plying in the coastwise trade.

Both of these ships have silver services that are valued at $30,000 each, and linenware for the dining-rooms and staterooms that bring the figure up to $50,000.

The holds are being converted into great oil-tanks so as to enable the vessels to easily make the voyage across the Atlantic and return without it being necessary to take fuel at a British or French port.

Motorship "Remittent"

On Friday, September 21st, the motor schooner "Remittent," a recent product of the Puget Sound Bridge & Dredging Co., left the builder's yard in the West Waterway for her trial voyage on the waters of Puget Sound.

The "Remittent" is a four-masted auxiliary powered schooner of the same type as the motorships "Tacoma" and "Portland," recently turned out by the same yard. Her length over all is 250′0″. Length between perpendiculars, 220′0″. Moulded breadth, 43′0″. Moulded depth 21′0″. She is powered with a pair of Mietz & Weiss hot-bulb type heavy-oil engines with a bore of 14″ and a stroke of 18½″ and developing 240 brake-horsepower at 240 revolutions per minute.

In addition to the main engines there is a two-cylinder 30-horsepower Mietz & Weiss hot-bulb type heavy-oil engine on a platform in the after end of the engine-room used to drive a 125-volt Allis-Chalmers generator at 400 r.p.m. and belt-connected to an auxiliary air-compressor.

In the center of the forward engine-room bulkhead is a 15-hp. electric motor direct connected to a 4-inch centrifugal fire and bilge pump and a small gear-driven Deeming oil pump. On the port side of this bulkhead is a 3″x2″x4″ horizontal duplex piston pump driven by steam or air pressure and used as an oil-trimming pump. A 6″x4″x46″ donkey pump driven by steam or air stands against the starboard side of the bulkhead.

An oil-fired donkey boiler of 1000 square feet heating surface is placed on the main deck at the break of the forecastle head. A 10″x10″ Hefferman windlass is used to handle the anchors, and an 8″x10″ Hefferman winch is placed at the after end of the forecastle head to handle hawsers and mooring lines. Four 8″x10″ Hefferman winches on the main deck serve the three large cargo hatches.

On the forward side of each of the main, mizzen and jigger masts is stepped a pair of long cargo booms so fitted as to allow of easy removal and stowage while the vessel is at sea.

The quarters for the crew of the vessel are exceptionally well arranged, being lighted by electricity and heated by means of hot water. A furnace for the purpose is fitted in the poop. The sanitary arrangements are of the best, as the quarters are well lighted and ventilated. Washrooms and shower baths with running water are also fitted.

A speed of eight knots was easily maintained throughout the entire trial trip, which consisted of a four-hour endurance run, the engines running smoothly and steadily at 220 revolutions per minute during the entire time. The owners expressed themselves as being highly pleased with the performance of the vessel.

Among those present on the trial voyage were R. M. Dyer, Manager of the Puget Sound Bridge & Dredging Co.; A. Chew, Superintendent of Machinery at the builder's yard; F. P. Harlow, Accountant for the Washington Shipping Corporation; Kenneth M. Walker, Representing the Bureau Veritas; Captain Carl Danielson and Toralf Ostbye, representing the owners.

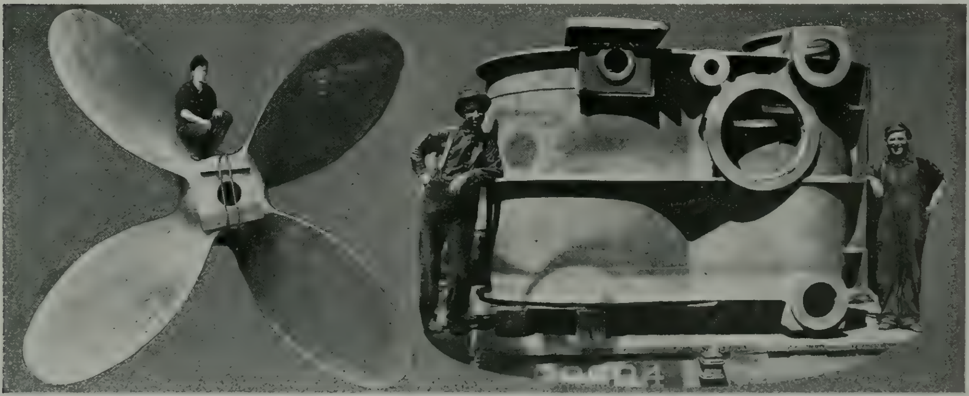
For service in the southeastern Alaska trade the Pacific Steamship Co. has chartered the steamers "Norwood" and "Firwood" from the Pacific American Fisheries of Bellingham. The "Firwood" is a recent product of the Pacific American Fisheries Shipyard in South Bellingham.

One of the sections of the large self-docking drydock "Big Bill" at the new Todd yard in Tacoma was put in drydock for repairs after having been struck by the Pierce county ferry "City of Vancouver" during a thick fog. This is the big dock's first repair job, and accordingly it begins its career by docking itself.

As a result of the completion of the Lake Washington Canal the interesting and unusual sight of large deep-sea vessels lying in the placid waters of Lake Union may now be seen. Libby, McNeill & Libby are building large terminals on this lake and are mooring their fleet of big windjammers at the new wharves.

John T. Heffernan, President of the Heffernan Engine Works, has been called East by the Government to assist in its extensive program of shipbuilding. Mr. Heffernan is associated with the American International Corporation, which has been requested by the Government to undertake the construction of 200 cargo vessels of 7500 tons deadweight capacity each. These vessels will be constructed of steel and will have a length of 380 feet and breadth of 53 feet. The yard of this corporation is being built in Philadelphia and will have fifty ways. They expect to launch fifty carriers a year.

Seattle's great fleet of halibut-fishing vessels are doing their bit this year. One vessel, the "Constitution," coming in from Heceta strait with a catch of 60,000 pounds in her hold, and another, the "Pacific," bringing in a catch of 42,000 pounds from the banks off the west coast of Vancouver Island.



A large four-bladed propeller and a low-pressure cylinder cast at the plant of the Olympic Foundry Company, Seattle, Washington. This concern is turning out a great amount of heavy marine castings.

Columbia River Activities

PORTLAND has been in the throes of a shipbuilding strike for more than a month and probably no happening since the establishment of new shipbuilding plants here a year and a half ago has proven how closely the revived industry has become associated in general lines of business.

The strike began September 15 with the walkout of wooden shipbuilding forces and was followed soon after by men in the steel plants, and the effect has been felt from the entrance of the Columbia river to Portland, more than 100 miles.

It was not long after the precipitation of the labor trouble that retailers here, at St. Helens and Astoria, found that the daily receipts were not as much as before and this condition had been extended to many lines until today, outside of the men principally concerned who have their finances invested in plants and realize that a month of the best possible building weather has been lost, there is a general clamor for the strike to be brought to an end.

Two of the wooden plants have not lost a day, their men having declined to go out. Others resumed after a week or two and they have been followed by two of the steel plants, one other refusing to start up until the difficulty has been adjusted, but other than the two wooden plants mentioned, none have full crews.

The attitude of the men is taken to mean that they propose to make no further move toward a settlement until the Federal Commission, which met here October 15, 16, 17 and 18, makes known its decision. Negotiations were carried on between representatives of the men and those of the employers, with G. Y. Harry as Federal mediator, but they were unproductive, as the men insisted on closed shop and the employers declined to consider that in any form.

As a matter of fact, outsiders point to the general walkout of workers as showing the situation was virtually a closed shop, though not recognized as such. The fear is general with the employers that the strike and its attendant delay will seriously hamper wooden shipbuilding as far as the Government is concerned. There is also a feature of additional wages, which, it is recognized, will undoubtedly be granted as all employers have declared themselves as willing to consider that, so with the added cost of material it is felt capital may be made of the extra expense of turning out wooden steamers by those opposed to that class of ships.

Firms engaged in handling equipment of all kinds, those building lifeboats and turning out various marine accessories in such widespread demand a short time ago, complain that since the strike new contracts are as scarce as the proverbial hen's teeth, operators of shipyards not wishing to enter into pledges for new gear until there is a more encouraging outlook for a permanent adjustment of labor entanglements.

One plant directly interested in ship construction, though not building hulls, the Willamette Iron & Steel Works, has kept going during all of the troublesome era, that establishment being strictly open shop and in spite of attempts to call the men out, only a few responded and today the works are running full blast and with a complete force in each department.

From the time the corporation undertook to handle auxiliary machinery, boilers and the like, in connection with the construction of 8800-ton tramps jointly with the Northwest Steel Company, it has speeded up its capacity until today the boilershop is turning out six big Scotch marine boilers a month and a few days ago a picture was obtained of them in a row on North Front street, waiting to be disposed of.

Three of them are for vessel No. 5 and the other four are under contract, having been built for the Albina Engine & Machine Works for the first steel steamers laid down there, which are of 3200 tons each. Besides there is a set of three boilers waiting on the dock for the next hull that the Northwest Steel Company plans to launch soon after a normal force is again engaged at its yard.

The Willamette Iron & Steel Works has moved into its renovated qaurters, an addition having been erected to the administrative building which more than doubles the space on the main floor, while above the area devoted to drafting rooms and the like is increased to the same extent.

Three boilers have been finished there for Mitsui & Company, well known Japanese steamship owners and importers, and they are waiting shipment to the Far East, where they are intended for installation in a new tramp. It is reported, however, that the American Government has declined to issue an export license to permit the boilers being shipped out of the country and from that action it is assumed there may be others halted, such as six taken from the wrecked steamer "Bear" that were purchased by Chinese.

At the Coast Shipbuilding Company, where four Government steamers are being built of wood, and at the Columbia Engineering Works, which has a contract for three more auxiliary schooners for M. T. Snyder of New Orleans, full time is being worked, those yards having escaped strike difficulties, though a few men deemed it discretionary to leave their work as they were enrolled in the union.

At the McEachern Ship Company's plant, at Astoria, more than half the required number of men are engaged, new material having been drawn from other localities in the Northwest and at the same time an early settlement is anticipated that will permit the old men to return, it being assumed that the Astoria union may accept a temporary agreement in advance of the Federal Commission announcing its findings.

Charles R. Page, California's member of the United States Shipping Board, represents the Pacific Coast.

Any who may have harbored any doubt of that had it dispelled during the time Mr. Page spent in Portland. He arrived Sunday, October 14, and departed the morning of Wednesday, October 17, going by automobile to St. Helens and Columbia City and then on to Willapa.

If he secured much rest during the Portland visit it was only during the usual hours allotted to Morpheus, for the Portland builders and Chamber of Commerce representatives kept him on the go. And he did not miss anything that will be of service to him at Washington when considering questions pertaining to the Beaver State yards or problems.

Mr. Page was the honored guest at a dinner Monday night at the Chamber of Commerce, arranged by H. L. Corbett, president of the organization, and while modestly admitting he "knew something of ships and shipping through his long connection with the Firemen's Fund Insurance Company," he emphasized the fact that today National questions are paramount, not those of a sectional character, and that while he was born and raised on California soil, he proposed to execute his trust in a manner that would be equitable to all, but placing the welfare of the nation above that of any state, district or city. His attitude was praised.

The dinner terminated with a general talk on shipbuilding problems, prospects for taking on additional work for American citizens or those of Allied countries by such plants as have not been granted Government contracts, and kindred subjects.

Harry Pennell, manager of the Coast Shipbuilding Company, and Captain E. C. Genereaux of the Bureau Veritas and Oregon Stevedoring Company, knew "Charlie" Page in former days at San Francisco, and they bespoke for him entre to the Oregon circle. Mr. Page was accompanied by J. W. Ackerman, commander U. S. N., who is with the Shipping Board, and Captain J. F. Blaine, district officer of the Board, with headquarters at Seattle. Talks were made by Fred A. Ballin of the Supple & Ballin Shipbuilding Corporation; F. C. Knapp, president of the Peninsula Shipbuilding Company; Mr. Pennell and Mr. Corbett.

Others present were James Feeney of Feeney & Bremer of Tillamook; Captain E. C. Genereaux of the Bureau Veritas; Bayly Hipkins, manager of the Foundation Company; George M. McBride, president of the International Shipbuilding Company; George B. McLeod of the Hammond Lumber Company; J. B. Kerr of the Peninsula Shipbuilding Company; C. E. Edwards of A. O. Anderson & Co.; Robert Dougan, Washington representative of the Chamber of Commerce; L. J. Wentworth, Portland representative of the Shipping Board; E. W. Wright, manager of the McEachern Shipbuilding Company; Don Green of the Coast Shipbuilding

Interior and exterior views of the big wooden steamer being built at the Kiernan & Kern Shipbuilding Company's plant at Portland, Ore.

Company, and W. D. B. Dodson, executive secretary of the Chamber of Commerce.

Shipbuilders are deeply interested in the action of the Emergency Fleet Corporation in granting the Kiernan & Kern Shipbuilding Company permission to enter into contracts with the well known Japanese house of Suzuki & Company for six wooden steamers, and for the Willamette Shipbuilding Company, a new corporation, to accept contracts for French interests for eight wooden steamers.

A steam schooner loading Dant & Russel lumber at Portland. This concern is enjoying a large business in Douglas fir, both domestic and export.

Up to the time that was made known, October 16, it was assumed that yards not favored with American Government contracts would not be allowed to build for others, except with the proviso that the vessels conform to the plans or wishes of the Shipping Board, that they might be taken over if needed. Instead, the Government has stipulated that ships cannot be built for outsiders if the construction interferes with the advancement of vessels for the United States, but otherwise only assurances are sought as to the identity of the contractor, the price being paid on a ton basis and where the material is to be obtained.

The Kiernan & Kern plant, at the foot of Mill street, is now engaged in turning out a large wooden steam schooner, the "John Kiernan," and space is ready for the construction of additional ways. The Willamette Shipbuilding Company intends to establish its yard at the foot of East Yamhill street, where it controls a river frontage of 260 feet with a depth of 540 feet.

At the Foundation Company's yard, on the old "boneyard" property, a fill, the largest undertaken by the Port of Portland in connection with the establishment of shipyards, has been finished and with all of the 10 sets of ways in place the company is prepared to go ahead on 20 wooden vessels under contract from the French government immediately on the arrival of certain machinery from the East, most of which has been ordered hurried across the country by express.

In advance of its arrival Bayly Hipkins, manager of the yard, has ordered the first vessel drawn in the mold loft and patterns are being taken from the lines, while the keel material is on hand and much other lumber is being worked in preparation for the frames being made up and lifted into place. That plant is today the largest in the district in point of the number of building berths and organization and it is strongly intimated that there are more French contracts to be closed soon.

Eric V. Hauser, manager of Grant Smith's shipyard and other interests here, has added to his accomplishments for the betterment of Portland in arranging for the complete outfitting here of 20 ships the Grant Smith-Porter McDougall yards are to build. Of this number eight are to be constructed at the Aberdeen, Wash., plant and 12 at the St. Johns property, in this city.

Some of the contracts under which the vessels are being built for the Government call for completed steamers, while others provide that the Government will supply the machinery. Mr. Houser intends to have an installation plant here and probably install machinery finished by the Government, that being taken care of under separate contracts. The company has one ship well along at Aberdeen and two vessels are being pushed here, while six other ways available at St. Johns will be occupied as rapidly as the material can be assembled. The corporation has assembled the men needed for the present and hopes to maintain an adequate force as the work advances.

With 57 vessels contracted for on the Willamette and Columbia rivers, also 41 for private interests, while the Shipping Board has 99 ships building along the Pacific Coast or under contract, for which machinery must be provided, a suggestion has been made that the establishment of additional wooden shipyards be discouraged.

One reason assigned for the attitude is lack of labor to place all in full operation at present. Regardless of the strike it is conservatively estimated that when yards now building are running to capacity at least 3000 more men will be required. The practice of some builders in attracting men from other yards with promises of higher wages is frowned on in that connection. Also it is pointed out that four months are required in which to start a yard and then the owners have only greeted their troubles, while the financial problem is that the cost is four times that with which they would be confronted in normal times.

O. W. Schwarz, formerly nautical expert with the well known Seattle house of Max Kuner & Company, manufacturer of nautical instruments, and now in the Navy, has been assigned to the Portland branch of the Hydrographic Office as nautical expert. He succeeds John McNulty, who returned to the Navy and is on duty at the Bremerton Navy Yard.

Portland loaded the new auxiliary schooner "Remittent" last month, she having reached the river from Seattle October 18. She will take her lumber cargo to the West Coast under charter to Dant & Russell.

W. A. Clark, deputy collector of customs at Portland, has been transferred to Marshfield to assume charge there. He succeeds Harry J. Kimball, who left the Government service to associate himself with others in shipbuilding on Coos Bay.

One result of the shipyard strike along the river has been to send men to other localities, the Rolph yard at Eureka having drawn 25 carpenters, who left October 15, while about as many went to Nehalem to repair the schooner "Oakland," which has finally been salved from the beach and moved across the spit to Nehalem Bay, and yet more workers have been drawn to Willapa and Grays Harbor.

Since the new lighthouse tender "Cedar" has been placed in active service in the Alaskan district, the tender "Kukui," belonging to the Hawaiian Islands district, has been ordered returned to her station, relieving the "Columbine," which will either be added to the Alaska district fleet or laid up. Before proceeding to Honolulu the "Kukui" will be extensively overhauled, and bids for the work were opened October 31st by Inspector Warrack, of the Seventeenth Lighthouse District, headquarters at Portland. Ray A. Northup, assistant engineer on the tender "Heather," was ordered to join the "Columbine" at Honolulu so she would have a full engine-room force to steam her to the mainland.

Captain Dan Killman returned to his old haunts early in the month, when he arrived from Sydney with the well known schooner "Henry K. Hall," laden with 1420 tons of copra, which she discharged at the East Washington Street terminal. The copra was sacked there and reshipped by railroad to New York. The "Hall" was seventy-five days making the run from the Antipodes, and immediately on being discharged began loading a return cargo of lumber.

Two of the auxiliary schooner fleet to get away during the month were the "Madrugada," built at the McEachern yard, at Astoria, which was on her maiden voyage, and the Seaborn, a steam auxiliary built at the Seaborn yard, on Puget Sound, but which is on her second voyage. Both carried West Coast lumber cargoes.

Oceanic Shipbuilding Company is the name of the latest corporation to join the wooden shipbuilding sphere, those interested being P. K. Enebo, at one time with the Peninsula Shipbuilding Company; B. G. Skulason, an attorney; Phillip Streib, banker, and Isaac Gratton, capitalist. The plant is to be established at Milwaukee, south of Portland, and it is understood contracts are being negotiated for.

At the site of the new plant of the International Shipbuilding Company, at Columbus City, donkey engines are being used in grading the site, and four ways will go in at once. George A. McBride, president of the company, who is also attorney for the Charles R. McCormick lumber and shipbuilding interests, says himself and associates are assured of private contracts in the event Government steamers are not allotted.

Judge Edw. C. Judd, of Astoria, a member of the Oregon State Board of Pilot Commissioners since July, 1915, has resigned because of having been appointed district attorney of Clatsop county. Governor Withycombe is expected to name his successor on the Pilot Board shortly. Others of that body are C. G. Wilson, Vice-President and Manager of the Clark & Wilson Lumber Company, and Captain Jack Speier, Harbormaster of Portland.

The diagonal planking used on the hull of the steamer being built at the Kiernan & Kern shipyard.

Willamette and Columbia river pilots have petitioned Colonel Zinn, Corps of Engineers, U. S. A., to open a straight channel on the Kalama side of the Columbia and expend no additional funds on the Goble channel, which is in a locality where fog hangs on longer than the opposite side of the stream, and a turn there is objected to by marine guides when handling large vessels. The Port of Portland Commission has recommended that the petition be granted.

W. N. Carter, for a lengthy period inspector aboard the Government dredge "Clatsop," has departed for Wrightstown, N. J., where he reports as a Lieutenant in the 26th Engineers' Supply Regiment.

George H. Kelley, a member of the Port of Portland Commission since February, when he was elected by the Oregon Legislative Assembly, has resigned and departed for Washington, having been commissioned a Major in the forestry regiment of the Corps of Engineers. Mr. Kelly is rated one of the most experienced lumbermen in the West, and in spite of the fact that he has a son in the railroad engineers' regiment, felt that he was of value to the Government in getting timber out of forests in France.

Navy officials have again taken up with the Port of Portland Commission a proposal to charter the tugs "Oneonta" and "Wallula," which are used at the mouth of the Columbia. The Port Commission declined to release the vessels a short time ago, and now it is hinted the Government may proceed to requisition them if necessary. The Commissioners aver they would not object if the vessels are to be continued in service at the entrance, but that if they are taken elsewhere no facilities would be available for handling sailing vessels to and from deep water.

J. L. Criswell, General Passenger Agent of the McCormick fleet, was in Portland a short time during the middle of the month, conferring with representatives here. Since the withdrawal of the turbiners "Northern Pacific" and "Great Northern" there has been increased business for the smaller carriers.

Captain E. W. Mason, of the San Francisco bay pilots, who was master of the San Francisco & Portland Steamship Company's liner "Beaver" until April, when he took up his present work, spent a week here last month visiting old friends. As he was with the steamship fleet more than eighteen years, he has many acquaintances in the Northwest.

Early in the month Joseph Supple, veteran shipbuilder, started a carload of shipknees, 250 of them, for Connecticut, where they are to be used in wooden ship construction. There has been an active demand in the Northwest for knees by East Coast builders, while shipments are being made of timbers and other special material.

Edward S. Hough, of San Francisco, designer of the Hough type of wooden steamer being turned out at Columbia River yards for the Government, was in the district during the month conferring with builders as to special details of construction.

The largest wooden passenger and freight ship yet launched in the South was successfully skidded into the water on September 15 at the yards of the Slidell Shipbuilding Company, Slidell, Louisiana. This vessel, the "Maple," is 190 feet long, 34 feet beam and 13 feet 4 inches depth of hold. She is powered with an 800-horsepower triple-expansion engine.

Seven Scotch marine boilers awaiting shipment from the plant of the Willamette Iron and Steel Works, Portland, Oregon.

Birdseye view of the Todd Dry Dock and Construction Company's plant at Tacoma, Washington. Some idea of the general arrangement of the plant may be gleaned from this picture.

Recent Happenings in Tacoma

REACHING the stage where active construction work may be expected at any time, the plant of the Todd Drydock & Construction Company at Tacoma is in a position to take steps with the other big steel ship building concerns of the coast. There has been delays in some lines which has thrown this plant back in active operations to a greater extent than the operators desired but these interruptions were entirely due to the heavy demands made upon all material and machine houses throughout the United States and not to lack of foresight on the part of the constructors here.

This modern ship building plant which has a site of some 97 acres on the east side of the harbor at Tacoma has been planned to be one of the best plants of its kind in the country. The different matters which have to be taken into consideration in building a yard were gone into thoroughly and while there was much to overcome the different obstacles have been cleared away so that the question of power, transportation and low cost of living for employees has been solved.

The work on the Todd Drydock & Construction Corporation plant was started about one year ago. In this time over 2,000,000 cubic yards of tide lands have been filled, launching ways constructed, power buildings, office buildings and steel sheds besides a modern floating drydock of 10,000 tons capacity placed in position.

From the east side harbor heights looking down upon the plant one can gain a very good idea of the position of the buildings and arrangement of the yards. From this point the observer is looking west with the dry dock and deep water side lying to the north.

Starting at the left one gets a view of the steel sheds and the over-head carriers which take the material from the rail line to the sheds. The steel sheds are 324 feet long by 250 feet wide at present but can be lengthened to 700 feet. Crane ways are included in these figures. Between the steel sheds and building berths may be seen the over-head aerials which handle the material going to the vessels. These aerials are mounted on 125 foot masts carrying a 2¼-inch cable. The distance between the aerial supports is 700 feet. There are six aerial carriers up. In direct line with the outer row of aerial masts may be seen the new restaurant and emergency hospital unit. This is 100 by 60 feet while the power plant, standing at the corner of the steel sheds, is 92 by 108 feet.

The general office building can be seen just back of the dry dock. This building is two stories in height and is 100 by 175 feet.

The dry dock, christened as "Big Bill," in honor of President William H. Todd, was constructed by the McAteer Shipbuilding Company at their Port Blakeley yard and is a sectional type of dock with four units. Each unit is 96 feet long by 126 feet wide with a 33 foot apron on ends. The dock is operated by electric pumps, each section containing its own pumping units. The first dry dock job was when one section lifted another of the units to examine possible damage done it by being rammed by the ferry steamer "City of Vancouver."

The launching ways are located just beyond the general office building. At present there are four ways but space has been allowed for the construction of six more ways which, it is understood, will be laid down in the very near future.

Following are the officers of the Todd Drydock & Construction Corporation plant: C. W. Wiley, president and general manager; C. S. Holmes, secretary-treasurer; J. A. Eves, assistant manager; C. L. Reed, superintendent of steel construction; J. R. Meston, superintendent of machinery, and Paul S. Savidge, superintendent of plant.

Reports received by J. T. Steeb & Company, custom representatives of the Garland Line Steamship Company, are to the effect that the steamer "Grayson," out from New York to enter the trans-Pacific trade out of here will arrive the latter part of November. The vessel will operate in connection with the "Justin" and "Javary."

After being in San Francisco for several days Earl Jones of J. T. Steeb & Company returned to Tacoma early in October.

Progress with all the ship yards at Tacoma is very satisfactory according to the different builders. On account of government restrictions the builders engaged in government work are not giving out much information.

Capt. W. M. Varney, inspector for the government at the Wright & Seaborn Shipbuilding Yards, has taken up the task of instructing a class of ship workers at the Lincoln High School here. This is an innovation and it is believed will meet with the approval of most of the ship yard employees. It is understood that the purpose of the school is to bring out the different forms of construction with the whys and wherefores of the same. Capt. Varney is one of the builders of the old school of wooden vessels.

The old stern wheel steamer "Greyhound," one of the best known stern wheel vessels on the Sound and Columbia river, has probably made her last trip as the inspectors have decreed that her hull is too weak for further use and the boat had better be laid up. She has been operated by Capt. H. H. Dawson and Eth. Emmons, engineer, for several months between Tacoma and Olympia but belongs to the Tacoma-Olympia Navigation Company. The "Greyhound," which was built on the Columbia river in 1889, is one of the fastest stern wheelers on the coast. On her last run from Olympia to Tacoma, distant 39 miles, she made it in 2 hours and 25 minutes.

Walter Bryant, representing the Marine Supply Company of Seattle, is connecting up with a great deal of the Tacoma shipyard trade these days. Mr. Bryant is a frequent Tacoma visitor, meeting inbound vessels beside the general trade.

Work on the constructive part of the Foundation Company's wood ship building plant at Tacoma is being rushed with all the speed that the builders can command. Frames for the mould loft and saw mill are up while nearly all of the twelve ways this company will have are piled.

At the Wright ship yard where the shipwrights and a number of the other laborers went out, it is stated that more men are being obtained and work is carried out as rapidly as material can be obtained. President George P. Wright of the company declares that while building has been slow it has been due to lack of lumber and not on account of labor and that all the help he needs can be had when the lumber situation clears up.

The "Mayachi Maru," the first of the Frank Waterhouse chartered vessels to discharge freight at Tacoma in several years, placed her Oriental cargo in the Balfour docks. On account of the port commission docks being so congested with salmon it was necessary to send the Japanese steamer here.

The new order making it necessary to secure permits for export shipments and to have the goods passed upon by custom officers is working a great hardship on agents at Tacoma. At the offices of the Osaka Shosen Kaisha the order has practically doubled the work of the clerical force while delay in securing shipping permits is holding up freight for the vessels and delaying them in a number of instances.

The interest owned by Capt. Floyd Hunt of the local steamer "Bay Island" has been purchased by Capt. Thomas Torgenson, who will operate the vessel on her old run with Chief Engineer Thomas Olds to sections of the upper sound adjacent to Tacoma.

Boatswain B. W. Bleecker, formerly Tacoma steamship man but who has been in the government service as Alaska pilot for several years, has been transferred to Tacoma and is acting as licensing officer for vessels at this port under the regulations that call for all vessels to be numbered and enrolled.

On her first trip to Tacoma since being taken by the government a former German ship now the "Northern Light" arrived here for coal the latter part of September in tow of the tug "Tattoosh," Capt. Parsons. The "Northern Light" is in command of Capt. McKay, formerly in the "Alex. T. Brown," who has a host of friends in Tacoma who were all pleased to find him in such a comfortable berth.

The big four-master "Golden Gate" was another arrival here at about the same time as the "Northern Light." The "Golden Gate" is in charge of Capt. Burgess and out from Pisgua, via Honolulu. Capt. Burgess and Capt. W. F. Andrews of the Washington Stevedore Company are old friends and found much of interest when they met.

Practically thirty scholars are enlisted in the government navigation school here and conducted by Prof. James E. Gould of the University of Washington. Tacoma has the only coaching school for deck officers in Washington.

Edward H. Chesley has succeeded Fred Doelker as shipping representative of the W. R. Grace Company on Puget Sound. Mr. Chesley has made his home at Tacoma for a number of years where he has been employed by the Grace company. Mr. Doelker has been transferred to San Francisco.

The auxiliary five-masted motorship "Jean Steedman," equipped with twin 160 b.h.p. Bolinder engines, which was launched from the yards of the Cameron-Genoa Mills Shipbuilders, Ltd., on September 22nd is now rapidly nearing completion at Victoria and will put to sea in a few weeks.

The Wallace Shipyards, Ltd., of North Vancouver launched the five-masted auxiliary schooner "Marie Bernard" on September 29th. The vessel is 236 feet long between perpendiculars, 45 feet beam over all by 20 feet 10 inches moulded depth. She will be equipped with twin 160 b.h.p. Bolinder engines.

Those Who Do Things

MR. M. P. FENNELL, Jr., has been appointed Secretary to the Harbor Commissioners of Montreal to succeed Major David Seath, who retired on account of ill health. Mr. Fennell has been Assistant Secretary-Treasurer of the Board since 1909.

Captain John Carson, Master of the ferry steamer "Santa Clara," has been appointed manager of the Southern Pacific steamer service on San Francisco bay to succeed Mr. William Chisholm, who resigned to accept service with the United States Shipping Board. Captain Carson has been with the Southern Pacific service for thirty-five years.

Mr. Charles B. Warren, for the past five years manager of the steamship department of Alexander & Baldwin, Seattle, left Seattle for Fort Leavenworth, Kansas, to fill his appointment as a First Lieutenant in the United States Signal Corps.

Mr. Welding Ring, of New York, has been appointed Chairman of the Chartering Board, which will act as agent for the Shipping Board.

Captain J. A. Jensen has been appointed a hull inspector for the U. S. Emergency Fleet Corporation and has been detailed to Grays Harbor.

Mr. A. G. Henderson, one of the best known men on Seattle's waterfront, has joined the traffic department of Frank Waterhouse & Company.

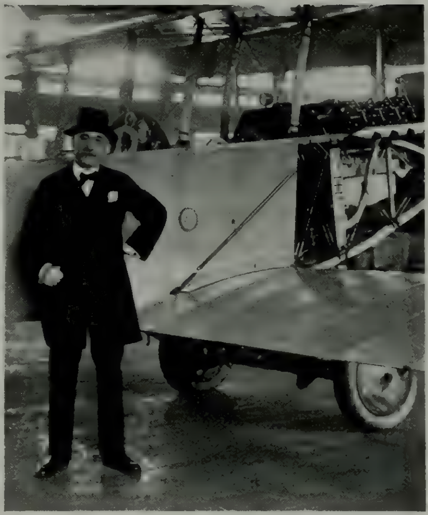
Australian Shipping Commissioner H. R. G. Larkin has been spending the past month in Victoria and Vancouver, B. C., investigating the possibilities of extending and increasing the Canadian-Australian steamship service after the war.

Mr. George H. Kelly has resigned from the Port of Portland Commission to accept the billet of Major of a special forestry regiment to be attached to the engineer division of the United States Army in France.

Mr. H. F. Alexander, President of the Pacific Steamship Company, was elected to the Executive Board of the American Steamship Association on October 6th.

Captain Milton Thwing has been appointed a San Francisco bar pilot in place of Captain von Helms, who resigned recently. Captain Thwing came to the Pacific Coast thirty-two years ago and has had a great deal of sea experience both in the coasting and off-shore trades.

Mr. L. E. Geary has been appointed naval architect for the United States Shipping Board's Seattle district. Geary is a Massachusetts Institute of Technology man and has had offices in the Colman block for years. He will now devote his entire attention to Government work.


Dr. Ira N. Hollis, President of the American Society of Mechanical Engineers, who was a visitor to San Francisco at the close of October, being entertained at the Engineers' Club.

Mr. Arthur F. Thane, of the San Francisco firm of A. F. Thane & Co., has been appointed by the British War Mission in the United States as purchasing agent for the British government on the Pacific Coast for all lumber, aeronautical materials and supplies, etc. Mr. Thane will also have charge of the shipping of certain supplies to Great Britain.

Mr. James French, chief surveyor in the United States and Canada for Lloyds, and Mr. H. A. Ruckkeene, assistant engineer surveyor at London, are at present on the Pacific Coast in the interests of Lloyds.

Captain Bion B. Whitney was recently appointed surveyor to the American Bureau of Shipping in the North Pacific Coast district to fill the vacancy caused by the resignation of Captain John F. Blain.

We note with interest that our old friend Bill Ringe, local representative of the Shepard Crane and Hoist Company and now on a visit to the East Coast, was one of the official starters in the annual field day of the Shepard Electric Crane and Hoist Company employees at Montour Falls, New York.

Mr. John T. Heffernan, president and treasurer of the Heffernan Engine Works of Seattle, has left for Philadelphia, where he will work in conjunction with the American International Corporation's great new shipyard, where a large number of freighters will be constructed to the order of the Shipping Board.

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NEW TRANS-PACIFIC SERVICE

The entrance of the Pacific Steamship Company into the trans-Pacific trade, which was announced as being permanently established during the past month, is one of the most important developments of the year in steamship activities on the Pacific. The route that the company has chosen lies between Seattle and Tacoma and Oriental ports.

The steamship "Senator," Captain George A. Zeh, made the first offshore trip for the company in September from Seattle to Singapore, this voyage being an experimental one. It proved so successful that a regular service will be established on November 15, when the steamer "Umatilla" will sail for the Orient. The "Senator" will follow her on December 15. Thereafter the number of ships operating on this route will be steadily augmented, and another big step will have been taken in the movement to place the American flag on the high seas.

"We believe that the American flag can be placed upon the Pacific to the extent that it will become a big factor in the transportation of our rapidly increasing exports and imports," said President H. F. Alexander, "and we believe that the Pacific Steamship Company is in a positon to help bring about this desirable object."

A. F. Haines, manager of the Pacific Steamship Company, was for nineteen years with Dowdell & Co., Limited, pioneers in the Puget Sound-Oriental traffic, so the operation of the new line to the Orient is in experienced hands. The Pacific Steamship Company, popularly known as the Admiral Line, has the largest Pacific fleet under the American flag. The coastwise service which it now maintains, with numerous terminals from Nome to San Diego, should contribute greatly to the successful operation of its offshore line. Both freight and passengers will be carried.

FREIGHT REPORT

By Page Brothers

Since our letter of September 19th, there has been some chartering on rate basis or lump sum, but very little on time charter for round voyages. The steamer "Arabien," fixed here to load on berth for Kobe and/or Yokohama, got $135,000. The "Otaru Maru No. 3," for same voyage, $41,500, charterers paying for bunkers; and several others on private terms, to other ports in the Orient.

The American ships "Star of Lapland" and "Star of Holland," fixed hence to Manila and return, the former for the lump sum of $220,000 on the round, and the latter on private terms.

For the West Coast there is inquiry for tonnage at rates of $37.50 to $40 direct port, but so far as steam schooners are concerned oil on the West Coast is hard to get and owners say they would have to pay $6 to $6.50 a barrel, a big advance, so they are hesitating about offering. It is only now and again a small sailer is available for West Coast, and as high as $40 net has been paid.

For Australia it is difficult to get tonnage for prompt or months ahead, and freights are advancing; $40 net is reported as having been paid for Sydney to load in midsummer of 1918. Vessels can get return freights of copra from Sydney at $30 and better, and even higher rates from the various Pacific Ocean islands—as high as $40 from some. Wheat tonnage is also being sought from Australia, and several sailers have been closed, some as high as 95/- per ton.

There is also demand for general cargo and hemp from New Zealand for either steamers or sailers, and the old steamer "City of Panama," converted into a sailing vessel, now named "Crowley," was closed to this port from New Zealand at $23 per ton of 40 cubic feet

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37-43 WALL STREET NEW YORK

AND BRITISH COLUMBIA, 264 COLMAN BUILDING, SEATTLE, WASHINGTON

THE NEW PLANT AT FORE RIVER

The new plant of the Fore River Shipbuilding Corporation, located a few miles south of Boston, will in the course of a few months be the greatest destroyer plant in the world. It will be erected by the Aberthaw Construction Co., of Boston, at a cost of over $9,000,000.

This is by far the biggest thing of its kind ever attempted in the United States, particularly in view of the fact that the first of 1918 should see the plant practically finished.

The complete development will comprise a large number of small destroyer slips and the necessary manufacturing buildings, the latter having an aggregate floor space of more than 2,000,000 sq. ft.

To gain some idea of this tremendous undertaking, compare it with the building of the great army cantonments, the largest of which contracts was two million less than the job just awarded the Aberthaw Company. It should also be noted the present development is a permanent proposition, the work being almost entirely reinforced concrete, whereas the cantonments were temporary structures, built mostly of wood.

After the completion of the plant the program calls for delivery by the Fore River Corporation within two years of at least forty-six destroyers. These will cost $1,500,000 each, or a total of $69,000,000.

In addition to the main plant outside of Boston there will be erected a two-and-a-half million dollar turbine plant at Buffalo and another one-and-a-half million dollar plant in Providence, R. I. The equipment from these plants will be shipped to Fore River as soon as completed.

The construction of the plant will require more than 4000 men, and the Aberthaw Company plans on having this full quota on hand by November. For the construction of the ships themselves the Fore River Shipbuilding Corporation will need from 8000 to 10,000 men at Quincy, 3500 at Buffalo and 1000 at Providence. They will endeavor to obtain part of the necessary quota by offering positions to Aberthaw men who are at present working on the construction of the plant.

Material for the ships will not be lacking since the priority board has given the destroyer builders preference over all other concerns working for the government, even over shipbuilders constructing the merchant fleet. Furthermore, the Carnegie Steel Co. has rolled steel for thirty-two destroyers in two months and can, therefore, readily make delivery for the ships to be built under the new program.

MARINE MISHAPS

"QUINAULT," Str.—From Brookings, Ore., Oct. 8th with a cargo of lumber for San Francisco, ran ashore on Oct. 9th, three miles south of Pt. Gorda. Steamer reported to be in bad condition. Passengers and crew saved.

"RAVALLI," Str.—From Southeastern Alaska for Seattle with a cargo of canned salmon, broke her thrust shaft and was towed into Prince Rupert on Oct. 7th by the Str. "Portland." She was later towed to Seattle by the tug "Warrior."

"NEILS NEILSON,", Nor. Str.—From Calcutta for Seattle struck on a rock outside of Port Townsend on Oct. 7th and remained fast for several hours. She sustained considerable damage to the bottom and about two hundred bales of burlaps in No. 1 lower hold were badly damaged by salt water.

"ESQUIMALT," Br. M.S.—From Vancouver Aug. 21st with lumber for Sydney arrived at that port Oct. 12th with engines disabled, leaking, and with deck load shifted.

"JANET CARRUTHERS," Br. M. S.—From Vancouver with lumber for Pt. Adelaide put into Honolulu Oct. 10th with damage to machinery. The propellers will be removed and the voyage will be resumed under sail only.

OREGON OAK SQUARE SHIP KNEES
We have on hand 452 finished Oak Shipknees, 2′ stem and 2′ root, from 4″ to 10″ thick. If interested, inquire at once. SULLIVAN & FORBES, INC., Portland, Oregon.

SEATTLE

The two large lighters recently purchased by the Pacific Steamship Company from the Columbia Construction Company of Portland have been renamed "Ensign" and "Commodore" and will be put in use gathering freight at points around the Sound and transferring it to Seattle. Hitherto the steamers of this concern have gone about picking up freight here and there, but it has been found more economical to gather the freight and bring it to the ships at Seattle, and at the same time this allows more time for engine overhauling in port. The "Ensign" has been made into a double-decked covered barge and is equipped with two electric elevators, the "Commodore" will be left as an open barge. These 900-ton floats will be operated by the Pacific Lighterage Company, a subsidiary of the Pacific Steamship Company, and will be towed by the "Warrior," a tug recently purchased by the steamship company from the Banning Corporation of San Pedro.

The Ames Shipbuilding and Dry Dock Company has purchased four lots forming part of their shipbuilding plant that had hitherto been leased by them. The property has a waterfrontage of 806 feet and a depth of 240 feet. The price paid is $150,000.

Rogers, Brown & Co. have leased four acres of Seattle tidelands from the Oregon-Washington Railroad & Navigation Co. and have commenced the erection of a wharf and warehouse and also five large steel oil tanks for the storage of soybean oil, fish oil and whale oil, china wood oil and rape-seed oil. This station will be used to accommodate the growing importation of these oils from the far East.

Brigadier-General Hiram M. Chittenden, U. S. A., retired, died in Seattle on October 9th, following a brief illness. General Chittenden was a former member of the Seattle Port Commission, resigning from that body in November, 1915, and was an ardent worker for Seattle port improvements and proved a big factor in expediting work on the Lake Washington Canal.

The Trans-Oceanic Company, which is headed by Mr. Drew Chidester, of San Francisco, and is the American agent for the Ocean Transport Company of Kobe, has opened a Seattle office under the management of Mr. Ralph T. Johns to handle the Puget Sound business of the concern. The Ocean Transport Company has a dozen large freighters nearing completion and will operate in the trans-Pacific trade both out of San Francisco and Seattle. Mr. Johns, like Mr. Chidester, was for many years with Dowdell & Co. of Seattle.

Mr. George M. McDowell has been appointed receiver for the Olympia Shipbuilding Company. The courts took this action at the request of the Grays Harbor Shipbuilding Company.

The British government has requisitioned most of the tonnage building for neutral owners in the Canadian shipyards.

It is reported from the Bremerton Navy Yard that Clifford Euson, for years chief clerk in the Portland office of the American-Hawaiian line, has been selected to enter the yoeman school, his steamship experience being regarded as valuable to Uncle Sam.

The United States Shipping Board has returned the steamship "Lieutenant De Missiessy" to the French owners after having commandeered her for war use. An article describing this vessel appeared in the October issue of this magazine. The "De Missiessy" was launched from the yard of the Skinner & Eddy Corporation on August 16th. She has been chartered to the shipping firm of James Griffiths & Sons of this city.

THE MADISON-KIPP LUBRICATOR

An unusual amount of interest in the force-feed mechanical lubricator is prevalent among engineers during this rapid development of marine oil-engines. Due to the grade of fuel used, the oil-engine must have fresh live oil, and the force-

LOCUST TREENAILS

A large stock of all sizes on hand for

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Special prices on carload lots for direct shipment from Eastern Mill

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The advertising experts told me you would not do this—that you were too set in your ways—that you did business by routine, that you would not take the initiative enough to answer an advertisement. But I know you will prove them wrong.

Give your men what they want.

Co-operate with the efficiency impulse of the man who uses the tool—you can do it profitably.

Riveting Hammers, Chipping Hammers or Sand Rammers—your men demand special qualifications from each.

In a Riveting Hammer he wants the utmost interchangeability between long and short pistons—so he can use the one best suited for the work—and this is what he gets in a Keller-Master Riveting Hammer.

In a Chipping Hammer he wants the utmost hard-hitting effectiveness—and he gets it in the Keller because of the straight-line-air-travel valve.

In a Sand Rammer, he wants the steady action and high speed operation that means uniform tamping—and the Keller Master Rammers fill the bill.

I wish you could see our catalog. It is not only good to look at, but it shows you the full Keller line, makes you realize that our slogan Keller-Made Master-Built means a high standard of superiority.

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130x34x8 ft. 4 in., load 8 cars or 450-500 tons as deck Barges.
SEA-GOING TUGS
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Burning Fuel Oil.
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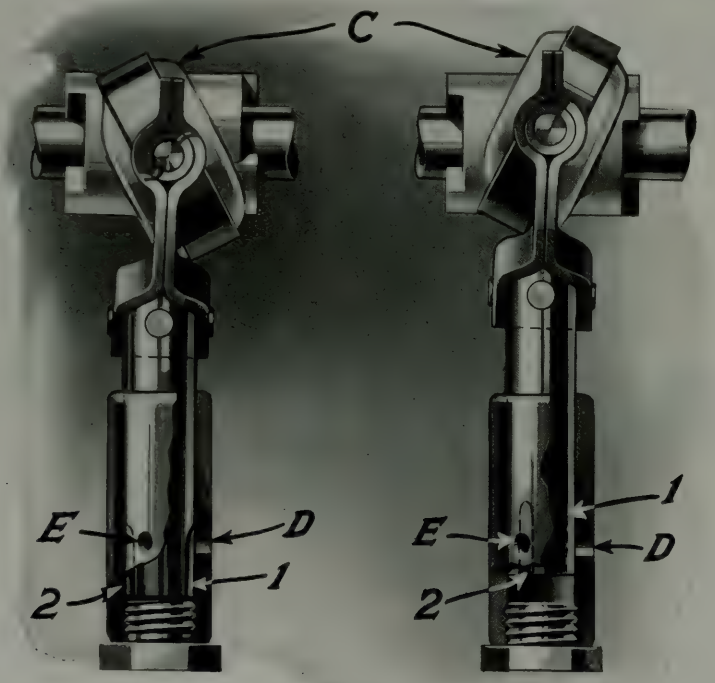
feed lubricator is the only system of forcing fresh oil to the cylinders and bearings.

There are two types of force-feed lubricators, distinguished by their pumping principles. One has ball and spring valves to operate the intake and outlet ports. The other is valveless, designed to eliminate the ball and spring valve.

The Madison-Kipp Lubricator, illustrated, is the valveless type. By a unique method of operating the plungers, the ports are opened and closed positively, eliminating the ball valves.

The Kipp no-valve principle is revealed by a momentary study of figures 1 and 2. The eccentric has its plane at an angle of 27 degrees to the rotating shaft. Therefore, in operation the eccentric not only lifts and lowers the plunger, but also oscillates it at the top and bottom of the stroke.



Madison-Kipp force-feed lubricator.

In Fig. 1 the plunger is in position to draw in a supply of oil through groove "1," which is registered with intake port "D." As the plunger is raised the oil is drawn into the barrels.

In Fig. 2 the plunger has been raised and oscillated at the top of the stroke so that it is in position to descend and discharge the oil from the barrel through discharge port.

It is evident that groove "1" has been turned away from intake port "D," sealing it; groove "2" has been turned to register with discharge port "E," opening it. At the end of the down stroke the plunger will be again oscillated back to its original position as in Fig. 2.

The principle has been the basis of design of Madison-Kipp lubricators for twenty years. The Madison-Kipp was, in fact, the first mechanical lubricator manufactured. The Kipp principle has figured prominently in its success, for it has added the element of absolute dependability so necessary in a lubricating system.

Madison-Kipp lubricators are known by marine engineers due to the fact that they are standard equipment on Fairbanks-Morse and Sumner engines. They are used also as equipment on Skinner Universal Uniflow Engines, Ingersoll-Rand Air Compressor, Chicago Pneumatic Tool Company Oil Engines and Compressors, and numerous other types of oil and steam engines. Two-thirds of the world's total production of agricultural tractors are equipped with the Madison-Kipp.

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High tensile strength.
Resistance to moisture.

Vehisote is a fibrous material, homogeneous in composition, and, therefore, entirely free from laminations; having no grain, it cannot split or check. **Vehisote** is waterproof and impervious to climatic changes.

This view shows one treatment of Vehisote Panelling, S. S. "Great Northern"

The builders of this steamer, Wm. Cramp & Sons, use Vehisote almost exclusively

Vehisote is carried in stock in San Francisco. Standard size sheets 6 feet by 12 feet. 5/16 inch and 3/8 inch thick.

Manufactured by THE PANTASOTE COMPANY

Scovel Iron Store Company

SAN FRANCISCO
PACIFIC COAST REPRESENTATIVES

Among the Makers and Operators

The Peninsula Shipbuilding Company, several views of which are shown herewith, was organized about July 1, 1916, and the first keel was laid at the plant the 20th of the same month.

Up to the present time this concern has turned out four completed ships of large size for private parties and has on the stocks four ships for the United States Emergency Fleet Corporation, these vessels being well along in their construction.

From a business standpoint as well as in equipment and shipbuilding ability, the Peninsula Shipbuilding Company holds an extremely strong position among the wooden shipyards of the Columbia River district. The directorate of the concern is made up of the following well known Portland business men: A. L. Mills, President of the First National Bank; W. M. Ladd, President of the Ladd & Tilton Bank; J. C. Ainsworth, President of the U. S. National Bank; Peter Autzen, President of the Peninsula National Bank; T. B. Wilcox, President of the Portland Flouring Mills; J. B. Kerr, of Carey & Kerr, Attorneys, and F. C. Knapp, President of the Peninsula Lumber Company.

The Peninsula Shipbuilding Company's yard is located directly alongside the mill plant of the Peninsula Lumber Company, from which concern it secures its supply of ship timber, and the team work that exists between these two closely related firms makes for ideal conditions and rapid progress of the work.

The office building housing the general officers of the concern and its force of draughtsmen is very commodious and, like the other plant structures, is substantially built and of a permanent character. In addition to the local drafting force, the company maintains at its New York office, 52 Pine street, a large force of competent draughtsmen to look after the Eastern shipowner and cater to his wants and ideas in reference to new construction.

The present building-ways at the Peninsula Shipbuilding Company's plant are all filled, but with its 137 acres of land and 3100 feet of Willamette river water frontage having a depth of 30 feet at mean low water, there is ample room for enlargement to meet any demands that may be made on this progressive firm.

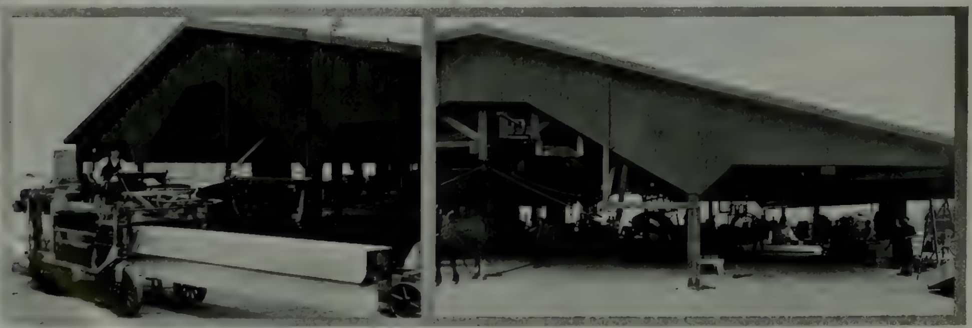
The views given show the up-to-date methods employed in shifting lumber about the yard, also the laying out of frames from large slabs, and two of the vessels in frame, one being in the open and the other under the cover of the ship shed.

TRAINING FOR FOREIGN SERVICE

Training for foreign service is discussed in Bulletin 37, 1917, just issued by the Bureau of Education of the Department of the Interior. This bulletin gives an account of the recent conference on this subject which was held in the city of Washington, on invitation of the Commissioner of Education in co-operation with the Director General of the Pan-American Union, the Director of the Consular Service, the Chief of the Bureau of Foreign and Domestic Commerce, and the Organizing Secretary of the Conference, Dr. Glen Levin Swiggett, Assistant Secretary General of the Second Pan-American Scientific Congress. The bulletin prints in full the addresses of the Director of Consular Service and the President of the National Foreign Trade Council.

"Training for foreign service," says Dr. Swiggett, who prepared the bulletin, "must be based upon satisfactory courses in commercial education. Industry, trade, and diplomacy are working conjointly in creating a new international policy for the nations of the world. The technique of commerce must be familiar to the consul and diplomat of the future. The social and religious welfare of a nation in foreign fields, with or without the supervision or patronage of the Government, can not be efficient without training in foreign relations courses based on the fundamentals of commercial education."

The address of the Director of the Consular Service, Mr. Wilbur J. Carr, deals at length with the functions of consuls of the United States, the organization and



View of the mill at the Peninsula Shipbuilding Company's plant showing the up-to-date trucks used in shifting timbers about the yard.

Two of the vessels building at the Peninsula plant in frame and scribing-frame sections on large timber slabs.

administration of the consular service, and the qualifications for entrance. Mr. Carr does not accept the view that business experience is indispensable to a successful consular career. "Some of our business men," he says, "are fond of the view that the consular service should be made up of men who have had practical business experience, and this view exists not only to some extent in the United States, but also in Germany and Great Britain, and presumably in France and other countries. It is based, however, on the fact that business men see only one phase of the activities of consuls, namely, that of direct promotion of commerce, and they overlook several other important duties of consuls. . . . Another objection to the proposition that consuls should be trained business men is that the Government will never be able to induce a large number of men of a higher order of ability to give up the independence and rewards of a successful private business for the meager compensation now or likely to be offered, and the unsuccessful or mediocre business man is not wanted."

Enlightened business men of the United States, as well as of other commercial nations, are of one mind in regard to the necessity and value of adequate educational preparation for business, domestic and foreign, and nearly all countries are already making plans to establish courses of study that will meet the business needs of these countries, particularly in the field of export. Mr. James A. Farrell, President of the National Foreign Trade Council, sums up this situation as follows:

"Those who are taking the initial steps by creating export departments in their organizations, and adjusting or changing their products to meet conditions prevailing in the markets they would reach, are, first of all, confronted by the problem of obtaining workmen, office men, salesmen, and executives trained to handle their business, a difficulty which, it is safe to say, but few companies, find easy of solution. This condition prevails because the foreign trade of the United States is in its infancy, and only recently has the question of special training been considered by public men, corporations, public schools, and universities.

STORAGE FOR PLYMOUTH CORDAGE

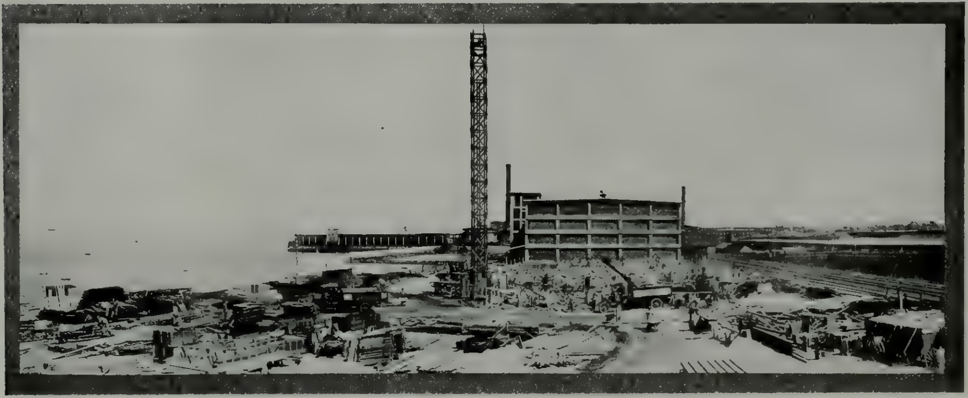
Looking at the illustration shown below, a man who neither uses nor sells rope would see only an interesting method of beginning construction on a large building, but to the user or seller of rope the above illustration has a greater significance.

It is the endeavor of a large manufacturer to keep faith with his customers, in spite of the unsettled industrial conditions, the congestion of traffic, and the extraordinary demands of the government and of industry in general upon his output.

The uncertainty of the transportation situation has made it absolutely necessary for the Plymouth Cordage Company to carry in stock at all times sufficient fibre to keep the mills running for long periods, while the hundreds of sizes and kinds of rope manufactured make necessary large stocks which will always be ready for immediate shipment upon a distributor's order.

In these new buildings there will be space for storage of over 200,000 bales of fibre and over 50,000,000 pounds of rope and twine. Warehouse No. 16, shown in the illustration, is 100 feet wide by 402 feet long and contains seven stories and a basement. Warehouse No. 17, which is not shown in the photograph, is 82 feet wide and 202 feet long and contains three stories and a basement.

Both warehouses are of the same type of construction. The columns are of reinforced concrete and the floors are of the flat slab type. The walls are terra cotta block, filled in between piers of reinforced concrete. The window frames are metal with wire glass. Spur tracks of the New York, New Haven & Hartford Railroad run alongside the warehouses, while the compressed air industrial railway of the plant runs through each warehouse. With the addition of these new buildings, the already excellent service given to their distributors by the Plymouth Cordage Company will be greatly improved.



At work on the fine new warehouse of the Plymouth Cordage Company.

THE FIRST HEINIE BOILER

After a fire which destroyed the National Guard Armory, Eighteenth and Pine Streets, St. Louis, Mo., a few months ago, the Heine Boiler Co., of that city, obtained possession of the first Heine boiler ever built, which was installed at the armory in 1881. This little boiler is shown in Fig. 1, just as it was removed.

It has 24 tubes about 10 feet long, and the heating surface is approximately 250 sq. ft., making the rating of the unit 25 hp. The boiler was built in the shop of Richard Garstang, St. Louis. The original pressure for which it was designed was about 100 lb., and an inspection certificate from the Fidelity & Casualty Co. has been received to the effect that they will certify this boiler to carry 80 lb. pressure at the present time. The report of inspection is quoted below:

The first Heine boiler ever placed in commercial use.

> Heine Safety Boiler Co.,
> St. Louis, Mo.
>
> Dear Sirs—Our Inspector, Mr. W. A. Rutledge, made an internal inspection on July 24, 1917, of the first boiler of the Heine type built by the Heine Safety Boiler Company.
>
> The boiler was constructed about thirty-five years ago and has been in continuous service since then and until the time of its removal to your shop, where it is now located on blocks.
>
> The tubes are pitted and before the boiler can be used, it will be necessary to retube it, also the blow-off flange should be renewed and the boiler completely provided with valves and trimmings if it is to be installed and used further.
>
> In the event of the boiler being installed, we could allow a working pressure of 80 lb. per square inch, after the above recommendations have been carried out.
>
> Yours very truly,
> D. C. HARVEY,
> Superintendent.

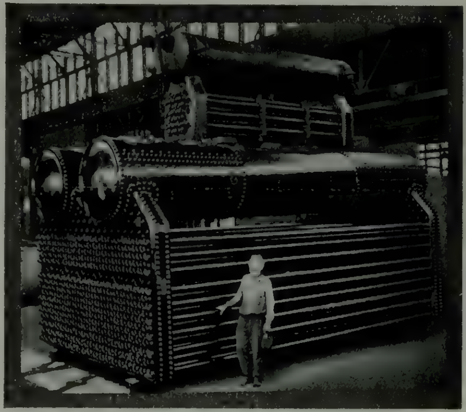
This indicates a somewhat longer life for water-tube boilers than is usually credited them by accountants or engineers when apportioning depreciation changes. However, under modern conditions the heavier loads on boilers would perhaps tend to lessen their life as compared to this little boiler. One odd feature is the casting which forms both the steam outlet and the water column. Another obsolete feature of this boiler is the vertical baffling, now the standard with Heine boilers of both the land and marine types.

The contrast in size between an average water-tube boiler of today and that of 1881 is shown in Fig. 2. The small National Guard Armory boiler was photographed placed on top of a 500-hp. unit, which is by no means a large size for present-day practice. Standing alongside of the larger boiler is one of the original workmen who helped to build this little boiler thirty-seven years ago—Mr. Joe Garstang, a brother of the proprietor of the shop in which the work was done. This photograph is of particular interest to the student of the history of steam-plant machinery, as it shows clearly the evolution in the design of each part of the boiler.

STOCKING UP ON FRISCO STANDARDS

During the past month a most unusual condition has existed among the engine trade on Puget Sound, as one has been able to observe the spectacle of engine buyers stocking up in advance on a certain make of gas-engine so as to anticipate their needs on what they consider an absolute necessity of their business.

Every year a large number of vessels are built on the Sound by fishermen and cannerymen to fulfill the increasing needs of the salmon industry, but this construction does not start until about the first of the year, and engines for the boats are not, as a rule, purchased until the buyers have decided on just what boats they will build and have let the contracts. This fall, however, buyers heard that there was to be an increase in the price of Frisco Standard engines October 1st, and so standard a part of their equipment has this type of engine become that they immediately rushed to the Pacific Net & Twine Co., the Puget Sound agents for the motor, and placed their orders far in advance of the time they usually buy, so as to avoid the increased cost. Never in the history of the Puget Sound agency has there been such a rush of orders in so short a time. Day after day for several weeks, literally scores of orders were booked for motors that ranged from 5-hp. single-cylinder up to the big 150-hp. models, from gillnet fishermen, trollers, seineboat men, cannerymen and every type of boatowner. Just what type of boats all of these engines are going into it is impossible to say as yet. Probably the owners themselves have not decided, but they knew when they did build boats that they would need engines, and they knew they wanted Frisco Standards, so having had a prosperous season they went ahead and stocked up on them so that they would be available when the time came for their need.


A modern 500-hp. Heine boiler, showing the first Heine boiler superimposed. An excellent illustration of the advance of the boilermaker's art.

IMMEDIATE DELIVERY QUALITY GUARANTEED
IRON GRATINGS IRON STAIRS STEEL DECK PLATES
SMOKESTACKS HAND WINCHES
HOSE REELS RODS AND BOLTS PIPE RAILINGS
ALL KINDS OF SHEET STEEL WORK AND REPAIRS
CITY IRON WORKS **PORTLAND, OREGON**

OUR ANNIVERSARY

⁂

On January 1st will appear the Fifteenth Anniversary Number of the Pacific Marine Review.

⁂

We plan to make our Anniversary Number the most valuable and at the same time the handsomest marine magazine ever published in America.

⁂

This will give our January issue a twofold advertising value. Aside from the drawing power that the Pacific Marine Review has built up through the character of its circulation and its persistent stand for the best interests of the American shipbuilder and the American shipowner, the January edition will possess the permanent advertising value of a book that is preserved both as a reference volume on account of its value and as a souvenir because of its beauty.

Write Us Now for Reservations

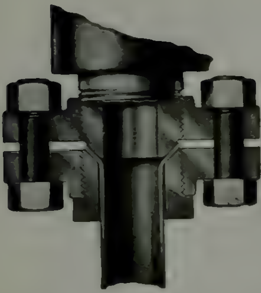


Fig. 4. Showing the lock nut and flange connections which are optional on the R. & D. Paracoil Evaporators and Heaters.

R. & D. PARACOIL EVAPORATORS AND FEED-WATER HEATERS

The R. & D. Paracoil evaporator provides a supply of absolutely pure distilled water for boiler feeding, drinking, culinary and other purposes. Steam from any initial pressure to that of the atmosphere may be utilized. This allows operation as a single unit or with multiple effect.

Figs. 1, 2 and 3 give a good idea of the form of construction employed. In general this evaporator consists of a cast iron or steel shell with swinging door to which is attached a new arc type of manifold and heating coils. The heating element being mounted in this fashion enables it to be swung outside for convenient inspection, cleaning or repairs, and due to its location within the shell an ebullition compartment is formed without the use of baffles, and complete circulation may be established without conflicting currents. A simple but effective form of baffle in the top of the vapor space eliminates all possibility of priming.

Top and bottom manifolds for steam inlet and condensation drain respectively are of cast iron or bronze, while the coils joining these manifolds are of seamless drawn copper and of such form as to provide for expansion and contraction and to eliminate strains on the joints. This permits scale to be removed by sudden flooding with cold water and blowing down at intervals, thus to a great extent doing away with the necessity of removing this scale by hand.

Joints between coils and manifold are made by slightly flaring the tube end and locking it between a tapered nipple on the manifold and a corresponding brass bushing. This is brought up tight by screwing into a brass lock nut that also threads into the nipple. If so desired, this joint may be made up of 2-bolt flanges.

Standard sizes of the D. & R. Paracoil evaporators are built up to and including that capacity of caring for 50 tons of water per 25 hours.

Essentially the R. & D. Paracoil feed water heater, which is of the closed type, consists of a shell of open hearth boiler-plate steel, or cast iron, as specified, containing a group of helical seamless drawn copper coils arranged in parallel between inlet and outlet headers as shown in Fig. 5. An extra large steel door having the same radius of curvature as the shell provides a means of access to the interior for convenient inspection, cleaning and repair. Standard units are made for installation in vertical positions; but where horizontal mounting is desired, the various fitting may be arranged accordingly.

Inlet and outlet manifolds are of cast iron or bronze, of a new segmental type that gives a smooth flow, and are in contact with the shell only at the side where the connections are made. The coils employed are interchangeable, of such form that practically no strain is placed upon the joints, and due to being corrugated in section, provide ample surface for the transfer of heat. Joints between coils and manifolds are made as indicated in Fig. 4 by slightly flaring the tube end and locking it between a tapered nipple on the manifold and a corresponding brass bushing. The latter is brought up tight by screwing into a brass lock nut that also threads onto the nipple.

Steam and water connections are flanged and drilled, the former to conform with the A.S.M.E. low-pressure standard and the latter with the A.S.M.E. extra-heavy standard. For pipe diameters of 2-in. and less, the openings are tapped. Suitable openings are also provided for drain, water gauge, safety valve, relief and pressure-gauge connections.

R. & D. Paracoil evaporators and feed-water heaters are marketed by Row & Davis (Engineers), Inc., 90 West St., New York.

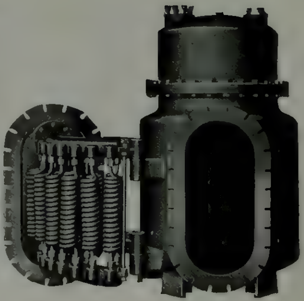


Fig. 1. R. & D. Paracoil Evaporator with cast-iron shell.

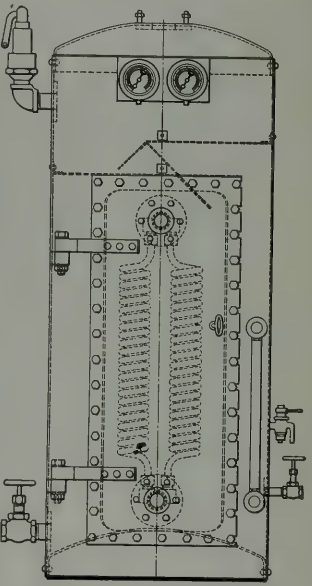


Fig. 2. R. & D. Paracoil Evaporator with plate shell.

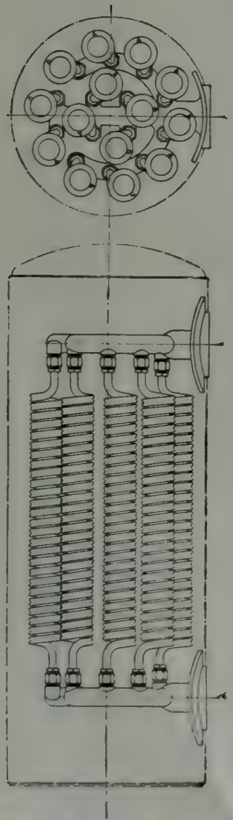
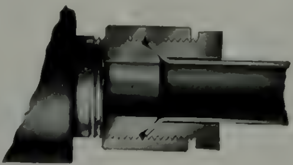


Fig. 5. Plan and elevation of R. & D. Paracoil Feed Water Heater.



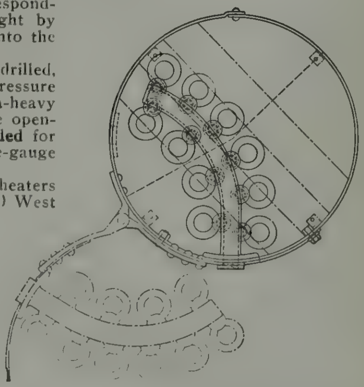


Fig. 3. Plan of R. & D. Paracoil Evaporator, showing method of supporting manifolds and coils.

Madison-Kipp Lubricators

VALVELESS **FORCE-FEED**

Lubricating Steam and Diesel-Type Engines

The lubricating problems of Diesel-Type and steam marine engines have this in common: Both demand an unfailing oil-supply fed against pressure.

The force-feed Madison-Kipp Lubricator is tested to supply oil against pressures as high as 133 atmospheres.

It is certain to supply constant and adequate lubrication for every engine part against any countervailing pressure encountered in either modern steam or internal combustion engines.

For both types it has advantages of so technical a nature that they cannot be described in a page advertisement.

For Diesel-Type engines it has in addition certain simple and outstanding superiorities.

It Feeds Only "Live" Oil

Since maximum compression is even more important in Diesel-Type engines than in those using spark ignition, the use of "live" oil only is more important.

Used oil loses its viscosity, becomes loaded with grinding sediment, and wears down the parts it is intended to protect from wear.

No matter how frequently it is replaced, it is certain to score and grind the cylinders to some degree—because even when relatively fresh it is in some degree loaded with sediment—and the desired functioning in compression loses efficiency.

The Madison-Kipp uses a given supply of lubricant only once—thus assuring "live" lubrication.

Since other systems waste much through oversupply and other losses, this better lubrication of the Madison-Kipp does not involve the use of more oil.

On the contrary, it usually represents a very material saving.

It Diminishes Oil Consumption and Repairs

The feed-adjustments of this lubricator can be easily and accurately made, so that waste is eliminated.

Even more important than the oil-saving is the reduction in repair time and costs.

Without the certain and adequate Madison-Kipp lubrication, bearings often suffer seriously through improper or vitiated lubrication, causing repairs or rapid depreciation.

So Madison-Kipp Lubricators safeguard the shipowner against excessive oil costs, swift depreciation, and grave repair charges.

Immediate Deliveries in Any Size

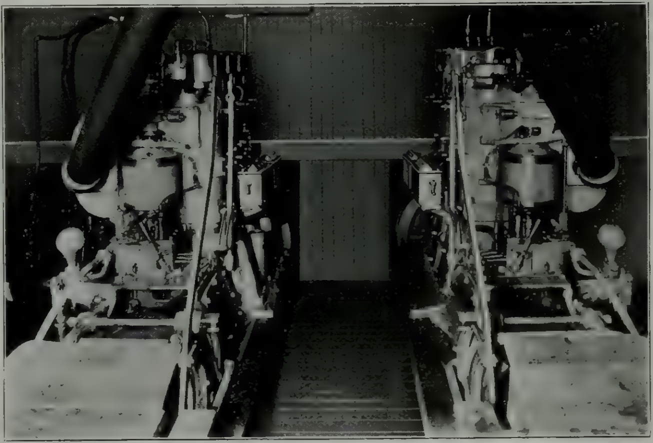
We are making immediate deliveries of thousands of Madison-Kipp systems, ranging from 1 to 50 and more units each.

They are used not only on Marine Engines, but also on heavy tractors, steam hammers, dredges and air-compressors. The factory in which they are made is the largest factory in the world devoting exclusively to lubricator manufacture.

We will gladly furnish any desired information, including blue prints and the like.

SEND FOR THIS SECTIONAL CATALOG

The catalog of Madison-Kipp Lubricators is printed in sections—one section being devoted to Mechanical construction, and others to its specific application and uses in clearly defined fields. We will be glad to send you the sections of particular interest to the shipbuilding industry as well as blue prints of charts and test-graphs applying to general and specific lubrication problems of interest to you.



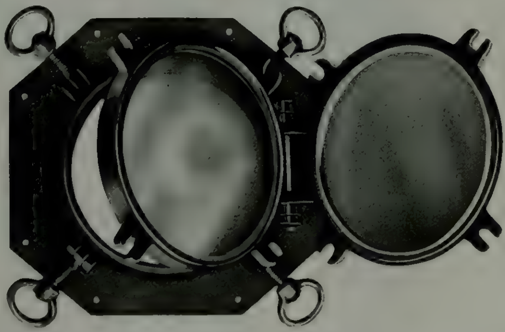
The standard equipment of Fairbanks-Morse Engines includes Madison-Kipp Lubricators.

The Madison-Kipp Lubricator Company

MADISON, WISCONSIN

15 inch Round
Composition Brass
PORT LIGHT

APPROVED
By the
SHIPPING BOARD
For Use on Vessels of the
U. S. Emergency Fleet



11 inch
Hexagon
Composition
Brass
PORT HOLE

Doud--MacFarlane Machinery Co.
Tacoma Wash.

PACIFIC ELECTRIC SPOT WELDERS

Electric spot welders which are rapidly superceding the older methods of riveting iron, owing to their economy in material, time and labor, are now being manufactured by the Pacific Electric Welder & Manufacturing Co. of Seattle, Washington. The company has many of its welders operating in various manufacturing establishments of the United States as well as Japan and Australia. It is gratifying to note that this company has developed quite an export business with Japan and Australia for the sale of its welders.

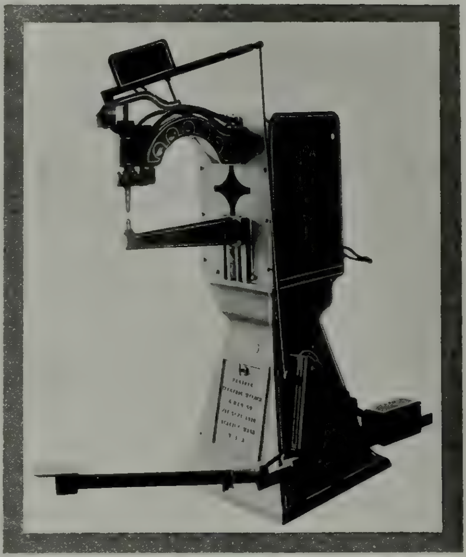
The welders are suitable for various classes of work in sheet metal and ornamental iron shops, stove manufacturers, shipyards, etc., and will readily be found an indispensable piece of machinery to manufacturers now engaged in riveting various articles of metal, owing to its great saving in time, labor and material, as well as its current consumption being less than the cost of rivets.

The electric spot welder is very simple in operation. It is the joining or fusing together electrically two or more metal sheets or parts without any preparation of the stock used. Mechanically it is equivalent to riveting, but it is stronger and much quicker and more economical. By placing the materials between the electrodes or welding points where it is desired to make a weld, then by applying the pressure either with the hand or foot lever, the metals are pressed together, electrical contact instantly made, and the weld accomplished; wrought, steel and galvanized iron are the best materials for electric welding.

Two standard types of various rating are manufactured by the company. One type is adapted to work on clear stock measuring thirty gauge to eleven gauge, or welding a combined thickness of one-quarter inch. While the other is for thirty to three gauge materials, or a combined thickness of one-half inch. Special welders to meet the requirements of various classes of work can also be manufactured.

The company has many letters from manufacturers now using the welders, which speak very highly regarding their merits.

The company's plant is a substantial structure consisting of about thirty thousand square feet of floor space, and, taking its present demand for the welder as a basis to judge, it is destined to become one of the leading manufacturers on the Pacific Coast.



The Pacific Electric Spot Welder. A welding machine that is rapidly growing in favor.

THE GEARMAKERS' CONVENTION

The American Gear Manufacturers' Association held its semi-annual session in Chicago, Thursday, Friday and Saturday, September 13, 14 and 15, at the Edgewater Beach Hotel. The Association numbers among its members practically all of the prominent gear manufacturers in the country. The Chicago session was the largest of any yet convened. Pittsburgh was the scene of the last meeting, held in May.

Special importance was attached to the present meeting because of the members' desire to effect as much standardization in gear products as possible—this in common with the Government's desires for all industry, now that the war is making special demands upon all manufacturers and users of materials.

F. W. Sinram, of Van Dorn, Dutton & Co., Cleveland, President of the organization, opened sessions Friday morning at 10 o'clock. A paper on "Advertising Dont's" was then read by J. C. McQuiston, Advertising Manager of the Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa. W. H. Phillips, of R. D. Nuttall Company, Pittsburgh, followed it with a talk on the "Heat Treating and Hardening of Gears."

In the afternoon the convention men were the guests of Chicago members. An automobile trip of about 75 miles through Chicago's huge park system was a feature much appreciated. In the evening a dinner, music, monologues, lantern-slide caricatures, and the like, provided entertainment for the visitors. All received a first-rate impression of Chicago and enjoyed the day.

Saturday a paper by B. S. Waterman, Brown & Sharpe Mfg. Co., on "Inspection of Gearing" was read; also another by H. E. Eberhardt, of the Newark Gear Cutting Machine Co., on "Spur Gearing by the Rotary or Disc Cutting Process," and another by F. Schneider, of Van Dorn, Dutton & Co., Cleveland, on "Spur Gears by the Sharper Method." All papers read at the convention were instructive and promoted much discussion. The members returned home feeling much had been accomplished of benefit to the industry—especially now that the country is at war and united understanding and effort necessary.

The plant of the Pacific Electric Spot Welder Company at Seattle, Washington. The manufacture of this apparatus has rapidly grown into an important industry.

Topping Brothers

IMMEDIATE SHIPMENT
of
GENERAL SUPPLIES
for
SHIP CONSTRUCTION

Ship Clamps
Deck Bolts
Boat Spikes

Clinch Rings
Tackle Blocks
Chain Hoists

Planker and Cotton Jacks
Iron and Steel Bars, Plates and Shapes
Boat and Ship Fittings
All Kinds of Tools

Railroad Spikes
Caulking Tools
Bolts, Nuts
Screws

Track Bolts
Shovels, Scoops
Rivets, Washers
Tacks

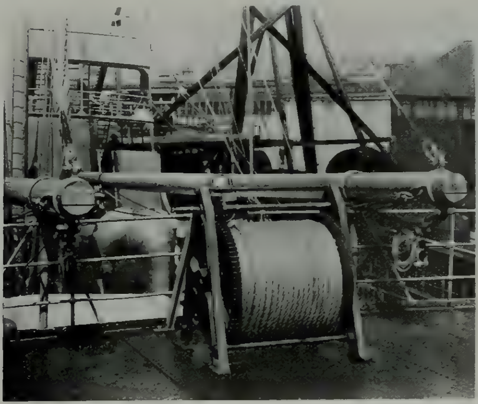
Chain and Anchors
Cotton and Oakum

Files
Fitting-up Bolts
Drills

54 WARREN ST. **NEW YORK CITY**

A HANDY HAWSER REEL

The Helser & Unden Machine Works of Portland are manufacturing a Hawser Reel for storing wire rope or cable on board ship. A great number of ships, both wood and steel, built and building in Portland are being equipped in this line by this firm. The Northwest Steel Co., Willamette Iron & Steel Works, Columbia River Shipbuilding Corporation, and the Supple & Ballin Shipbuilding Co. are all heavy users. The two boats already placed in commission by the Northwest Steel Co. and the Willamette Iron & Steel Works, the "War Baron" and the "War Viceroy," are equipped, and all the boats being built by these companies, the "Hallgrin," "Willy Gilbert," "Landaas," "Vestervarde," "Vestersjord," and "Umpqua," are having them installed. Twenty-four were recently sent to Seattle to be installed on the twelve boats of the J. F. Duthie & Co., and a contract has just been finished whereby twenty were furnished for the Columbia River Shipbuilding Corporation's boats. The reels have a capacity of 720 ft. of 1⅝-inch wire rope and weigh approximately 1200 lbs. They are proving very successful wherever tried.



The Helser & Unden hawser reel on the steamer "War Baron," recently completed by the Northwest Steel Company.

THE PORT OF NEW YORK

Increasing Receipts of Freight Piling Up on New York's Antique Harbor Equipment.

By S. S. Hampton

The port of New York keeps up a steady increase in the receipt of freight for export, and every facility is strained to the highest tension.

Local officials have done well with the limited amount of money available for improvement, although there has been room for the hand of genius for years. It is now evident that private capital and the close co-operation of New York City, State, and United States officials will be necessary to complete the reorganization of the port's freight-handling system to deliver the unprecedented quantity of merchandise arriving daily from all parts of the United States and other countries. These shipments are arriving with such confusing regularity that it is almost impossible for steamship companies to assemble cargo for a steamer with any degree of dispatch.

Many operators are organizing their own stevedoring companies to specially assemble freight intended for export, and barge companies are building many barges for harbor use. Little relief is felt, however, along these lines, and it is freely predicted that freight for export will soon be piled high in West and South streets in all kinds of weather if more pressure is not brought to bear on the matter.

Quite some confidence is entertained by many shipping men that conditions will improve on account of the newly organized New York and New Jersey Port Commission, which is intended to carry out extensive improvements along the waterfront, and it is reported that a plan for improvement costing $500,000,000 is under consideration.

The chairman of the New York Commission, appointed by Governor Whitman, is William R. Wilcox. Arthur Curtiss James and Eugeniuus Outerbridge are members of the board. The chairman of the New Jersey Commission is J. Spencer Smith, and De Witt van Buskirk and Frank R. Ford are members. William Leary is Secretary of the Board, and Major-General George W. Goethals is Consulting Engineer.

On account of the opening of the Panama Canal, New York has become the star of the commerce of the world, but it is sadly in need of the proper facilities to handle the enormous commerce now offered.

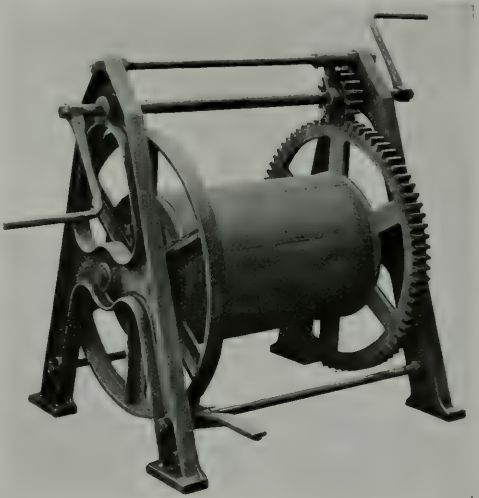
Merchandise arriving at the port of New York, so meagre is the supply of drays, trucks, barges and warehouses to receive it, and the railroads tiring of the burden of storing freight after hauling it a long distance, and needing cars for road service, is unloaded along suburban sidetracks, where it waits for the arrival of a steamer and consequently is subject to great damage and in some cases total loss.

The port's trucking is done by a combination of one, two, three, and four-horse drays, automobile trucks designed for no particular class of freight and a short supply of barges, old-style steam lighters and coal-burning tugs. It is almost impossible to move freight for manifest quickly and without great expense, and the arrival of fall crops will increase these troubles a hundredfold.

Chicago, New Orleans, Galveston, St. Louis, Baltimore and other large cities have anticipated a steady increase of commerce, and with the assistance of private capital have constructed mutual termianl railways, warehouses and floating equipment which are operated on about the same plan as the New York subway.

It is hoped that the new port commission will proceed without hesitation to interest private capital in the erection of a terminal which will include a system for the interchange of freight, construction of warehouses and floating equipment second to none in the world, which will give shipping men and steamship companies the service which they deserve.

The time for individual effort in freight transfer and the storage thereof has past and team work is now necessary if the dignity and supremacy of the port are to be maintained. If the freight arriving in New York was delivered by one mutual company, more prompt results could be obtained and commerce would move more regularly.



The Helser & Unden hand hawser reel, a useful and efficient item in a vessel's deck equipment.

Steamship owners and shipmasters are fascinated with New York, but the loss in business will soon decrease this feeling if the port fails to make improvements to meet the ever-increasing commerce.

W. F. STONE

SHIP-BUILDER

Designer and Builder of
Wooden Commercial Vessels
of all Descriptions

Yachts and Pleasure Craft

Kennedy & Boehmer Streets
Phone Fruitvale 430 OAKLAND, CAL.

ESTABLISHED 1880

C. BEYFUSS CO.
SHIP BROKERS
244 CALIFORNIA STREET SAN FRANCISCO

MARINE INSURANCE

PHOENIX ASSURANCE COMPANY,
Ltd., of London
PACIFIC COAST DEPARTMENT,
E. C. F. KNOWLES, General Agent

THE UNION MARINE INSURANCE
CO., Ltd., of Liverpool
222 Sansome St., SAN FRANCISCO
S. A. LIVINGSTON, Underwriter

Get the Best!

MARTELL PACKINGS
LAST LONGER WEAR BETTER
CREATE NO FRICTION

Marine work our specialty

Western Representatives
Marine Work:
FORD & GEIRRINE
SAN FRANCISCO

The Martell Packings Company
Factory and Home Office:
ELYRIA, OHIO

Eastern Representative:
MR. W. S. HAZLETT
2543 Jasper Street
PHILADELPHIA, PA.

Van Arsdale-Harris Lumber Company
FIFTH AND BRANNAN STREETS SAN FRANCISCO, CALIFORNIA

White Cedar, Spruce or Sugar Pine Template Lumber
Worked to Any Thickness Desired

Redwood Pattern Stock
In All Grades and Thicknesses

White Cedar
For Mould Loft Flooring

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BEATING A RUSSIAN COAL COMBINE

A striking account of how the Russian government saved more than $6,000,000 on purchases of English coal during 1914 and 1915, by sidetracking the Russian coal middlemen who had squeezed millions of dollars out of the imperial treasury in earlier years, is given at length in a recent issue of "Fairplay." The article speaks with frank severity of the Russian coal combine, and gives figures and charts to show the exorbitant prices demanded by the middlemen, and the much lower prices actually paid by the government after it began to buy direct from the English collieries, and to make its own charters of ships to carry the coal to Russia. On the point of the middlemen's monopoly, the article says:

"For years the Ministry of Marine (Navy), as well as other large consumers of coals in Petrograd and surrounding districts, were compelled to purchase their coals from Petrograd middlemen, amongst whom a very important role was played by Hugo Stinnes, who formed in Russia a Russian company and became the leader of the coal trade. He, more or less, organized a pool system of all the important importers of coal in that district, and it was practically impossible for anybody to compete against them or for the consumers to buy direct. Purchasers were at the mercy of this 'ring,' who controlled not only the prices, but also the quality of the coals mined."

A plan for cutting far under the middlemen's prices, and for insuring good quality of coals, was worked out by a representative of the Ministry of Marine in London, in connection with a commercial organization which carried out the detail work of loading coal brought direct from the English collieries and shipping it in British and Russian ships chartered by the Ministry of Marine. This organization was R. Martens & Co., Ltd., of London, who have branches all over Russia, in England, and also in New York and Paris. A firm of English chartered accountants was given supervision of all the records of all the transactions on account of the Ministry of Marine through R. Martens & Co., and the article in "Fairplay" gives numerous tables and graphs which show the middlemen's bids, the much lower actual cost under the new system of direct purchase and government chartering of ships, and the savings on certain large groups of coal shipments on the basis of the middlemen's prices.

On 763,911 tons of coal shipped to Archangel during 1914, the saving to the Russian government amounted to approximately $6,150,000. The Ministry of Marine paid 23s. 5d. for this coal, or an average c.i.f. cost of 47/3 for coal shipped in Russian vessels (which receive a shilling per ton higher freight than foreign ships); and an average c.i.f. cost of 43/6 for coal shipped in British bottoms; against the middlemen's bid of 77/6 c.i.f.

On coal shipped to the authorities of the Port of Archangel during 1915, the saving by the new method was 30/9 per ton over the middlemen's price of 77/6 per ton. The record ends with 1915 because the growing scarcity of tonnage, and government control of nearly all tonnage under requisition or charter, made commercial initiative practically out of the question.

A beginning on the new plan was made by a representative of the Russian Ministry of Marine in 1911, and in 1912 and 1913 parts of the ministry's coal purchases were so made, the results serving to prove to everyone concerned that the middlemen were receiving a great deal more than it was necessary for the government to pay. The new Council of Petrograd, in 1913, also adopted the new plan, in part, without notifying the middlemen of their intentions. Here the difference in prices was as noteworthy as in the case of the ministry. When the middlemen got wind of the direct prices, they came down on their own prices by an average of $1.60 a ton; but even with this concession, the council bought English coal direct at a further saving of 3 shillings a ton from the reduced prices of the middlemen.

Transport of munitions was also accomplished on the new plan, the Russian government committee in London adopting the method of the Ministry of Marine, with the result of notable economies in freight costs. The first year of the carrying was not of great consequence, yet it was possible to ship munitions at the freight charge of 40 shillings a ton, under which charge came also such materials as picric acid, trinitrotoluol, and bulky cargoes like motor cars, cotton and other materials.

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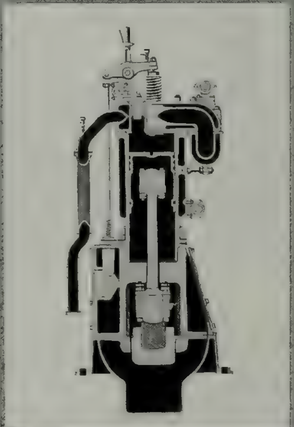

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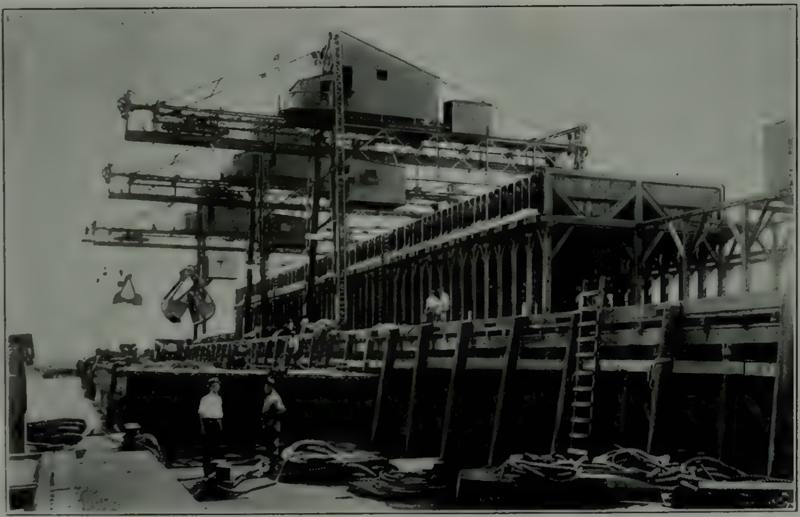

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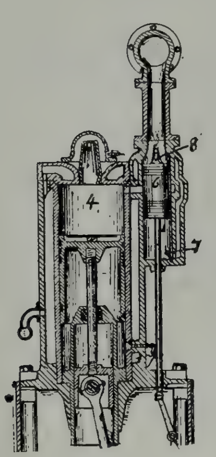
A NEW TWO-CYCLE ENGINE

By C. J. Kohler



Section through the cylinder of a "Beatall" engine.

The latest two-cycle internal-combustion engine to be put out by a Western designer is known as the "Beatall" engine and was designed by Mr. Herbert Harvey, of 5620 Telegraph Avenue, Oakland, Cal.

The side elevation, Fig. 1, and the section, Fig. 2, herewith illustrate the working principle of Harvey's design. The fuel charge is taken in at port 1 by the upstroke of the piston. It is then compressed in space (2) to about 8 pounds on the down stroke of the piston. Near the bottom of the down stroke, the exhaust valve (6) is opened by an eccentric which allows the burnt gases to escape out of exhaust port (5). Connection is now made between the spaces (2) and (4) by the by-pass port (3), allowing the gas that was compressed to 8 pounds in space (2) to enter the combustion chamber (4). The exhaust valve is then closed and the piston starts on the up stroke again, completing the cycle.

Scavenging is obtained through a special piston exhaust valve. As the piston valve opens a small quantity of air is compressed in space (7), which air is then ejected through the nozzle (8) creating a vacuum which draws the remainder of the burnt gases out of the cylinder. An advantage claimed is that whatever carbonization takes place tends to make this valve more efficient in that it packs around the rings and helps to seal the compression more tightly.

In the design of the moving parts of the engine, ordinary marine steam engine practice is closely followed.

MEETING NECESSITY WITH CEMENT

Sonsonate, Salvador, C. A., July 28, 1917.

Portland Cement Association.

Gentlemen: Your cable dated yesterday regarding the reinforced concrete boat reached me last midnight and I proceed to explain.

The row-boat myself and my "prospective 'pard'" built years since, if still afloat is thousands of miles from this place, and "from nowhere," and consequently I am unable to furnish photographs but I will endeavor to furnish you with a pen-picture of its construction, hoping thereby, as age prevents my presence on the firing line in France, to thus indirectly get a crack at the Kaiser and his cattle in the name of democracy, and incidentally to aid our beloved Uncle by boosting his cement business. I am an American first, last and all the time, and personally have "no ax to grind."

Employed with by aforesaid "pard" to "hold down" the scattered supplies and loose property of a busted mining company back in the 90's; we found ourselves with any number of barrels of cement and several tons of woven wire screen sheets, plus other mining plunder, and all the unoccupied time, the Lord was then making, on our hands, and when we became so thoroughly tired of too much rest that we were becoming quarrelsome we proceeded to "do things."

Experiments with cement and woven wire in the building of a bath-tub, horse troughs, and an "American cooking stove," convinced us that what we didn't know about Portland cement, if written out, would make a much larger book than Webster's Dictionary and contrary to Joe's—my pard's—convictions profanely expressed whenever anything hitched in the proceedings—he knew the d—d thing would go to the bottom like a kedge anchor, and was continually kicking about our wasting so much **valuable** time, we proceeded to build of stone the first boat of that material, possibly, that ever floated on water.

We decided to build the boat keel up and I made up drawings on such basis. We prepared a cemented building floor curved to the lines of the craft's gun'als, marked on the floor the center and interior lines of the boat and to such lines built up with a suitable mixture of clay and sand a solid "core" of the exact interior size and shape of the boat to be.

To fit such a core as exactly as possibly we then built a skeleton boat of the heavy screen wire, joining the sheets solidly with copper rivets and wire and fitted same over the core described, which we had previously plastered with a ½" coat of wood ashes to prevent adhesion of the cement. Our wire was quite stiff and heavy but easily workable to shape by hand and mallet and of about a ½" mesh. Outside of this mesh, as we troweled in the concrete—a 1 to 1 mixture of cement and clean river sand, we built as we went along a retaining dam or shell of damp clay to hold our concrete in place, calculating as nearly as possible a uniform thickness of an inch, excepting on the bottom where we gave the job a thickness of nearer 2".

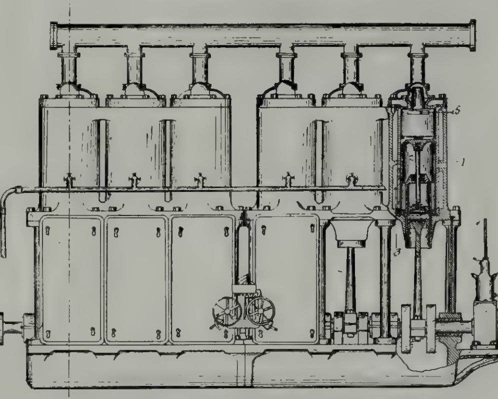
Our concrete was sloppy but not too much so to trowel, or too little so to pour, but the craft was not poured.

We put her in the lake after about a month's wait and to Joe's chagrin, she floated O. K.; lopsided and down at the stern, 'twas true, but she floated—our nigger's verdict was, "for de Lord, dem is de crazyestes white folks I ebber sawed."

Joe became at once an enthusiastic marine architect hewing that old tub with a hatchet until the wire showed in spots and she rode an even keel much too high out of the water. I discovered that owing to the continual guying with "she'll sink like an anchor," I had been frightened into building her ½ to a foot too deep. She was, strange to say, springy under foot as a wooden boat, and once under way as speedy as the Indian canoes.

We built a second and much better boat—18 footer—that we continually used with oar and sail until we were forced to leave that howling wilderness owing to a dearth of canned goods—our only legal tender with the natives—our company having forgotten its mines, us and our $10 per day as caretakers. This second boat was a James Dandy. You will note our boat was built without frames, a system which of course would not work out with large craft.

I believe 10,000 ton steamers of uniform dimensions can be turned out at one-fourth the cost of wooden ships by the system of reinforced concrete construction, and much faster than Uncle Sam can put the engines in them.



Sectional elevation of a "Beatall" engine, one of the latest internal-combustion motors.

Tell your engineers to get their think boxes tuned up on this proposition if they wish to cut a swath in future history.

Yours sincerely,

P. P. Brannon.

For Sale—FOUR NEW LAUNCHES, 45x11 feet with 50 H.P. STANDARD engine.
LAUNCH, 52x12 feet, with 65 H.P. STANDARD engine.
LAUNCH, 65x18 feet, with 11 H.P. STANDARD engine.
CAR-FLOAT BARGE, 272x50x15 feet, net tonnage 1374 tons.
FOUR WHALEBOATS, 30x6½ feet, very cheap.
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Howard St. Wharf, San Francisco, Cal.

IN NEW QUARTERS

A. H. Cox & Co., machinery merchants, engineers and contractors, of Seattle, Washington, recently moved into larger quarters, taking possession of the building at 307 First Avenue South, located alongside their former building. In addition to seven full floors, this move gives A. H. Cox & Co. facilities in the rear of the building for heavy machinery, while dock space on the Eyers dock takes care of shipments either by water or rail. The repair shop is located on the top floor of the new building and has received greatly increased facilities for handling work. The stock has been replenished and enlarged, making possible prompt deliveries for shipyard, contractors or industrial machinery. Air-compressors and pneumatic tools are also heavily represented in the stock rooms. The engineering department of this concern is very complete, and is prepared to undertake work along electrical or mechanical lines, handling complete power-plants and both making and overseeing installations.

The Worthington Pump and Machinery Corporation announces the opening of a new branch sales office at the American Trust and Savings Bank Building, Birmingham, Alabama, to take care of a portion of the territory hitherto controlled by the Atlanta office. Mr. Edward Stauverman, formerly with the Atlanta office, will be in charge of the Birmingham office as manager.

Mr. Harry Jacobs, with offices in the Arcade Building, Seattle, Washington, has been appointed as a representative of the Schaper Construction and Material Company of New York, and Jacobs & Gile, with offices in the Railway Exchange Building, Portland, Oregon, have been appointed to represent the same firm in the Columbia River district.

Last year Mr. J. M. Keely, the resident Southern Representative of Chas. D. Durkee & Company of New York, left Tampa, Florida, to visit the Pacific Coast customers of the Durkee Company and his first visit to the Pacific Coast proved so enjoyable that he hopes each year to spend three months on a trip from Vancouver to San Diego. Mr. Keely is known as "Sunny Jim" to a small army of business friends in Florida, Texas and Alabama.

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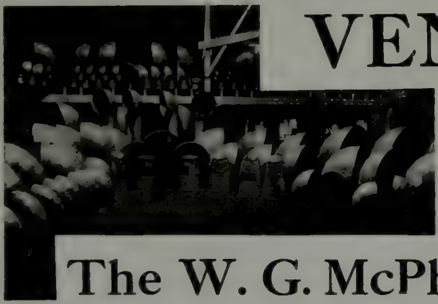

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VANCOUVER, WASH.

TRADE PUBLICATIONS

FACTS REGARDING SCREW-PROPELLER DESIGNING, by the American Screw Propeller Company, Penfield Building, Philadelphia, Pa. The American Screw Propeller Company uses the Dyson method of design in getting out propellers for all classes of ships. This method is too well known to need any further mention here, and the catalog mentioned above merely outlines the reasons for scientific propeller design, gives the opinion of many noted designers and shipyard managers regarding the Dyson method, and sets forth the information required by the American Screw Propeller Company in order that it may furnish a design of the highest efficiency for any given vessel.

TRAHERN LUBRICATING PUMPS, by the Trahern Pump Company, Rockford, Ill. This folder describes a full line of Trahern Lubricating Pumps for handling water, oils and cutting compounds on machine tools. The Trahern output is well known, being used to a large extent by many of the country's leading tool makers.

HOISTING MACHINERY FOR INDUSTRIAL WORKS is the title of an attractive loose-leaf catalog issued by the Shepard Crane and Hoist Company of Montour Falls, New York. This handbook is intended to present, in clear and exact form, such data relative to the equipment made by the Shepard Electric Crane and Hoist Company as will enable engineers and managers conveniently to consider the application of hoisting and conveying units to the various uses for which they are adapted, and to enable them to prosecute expeditiously and with certainty all related engineering and construction work. The various types and sizes of hoists and cranes illustrated are all standard products.

GENERAL CATALOG, issued by C. F. Braun & Co., manufacturing engineers, 503 Market street, San Francisco. This catalog is a handsomely bound volume containing the loose-leaf feature whereby future bulletins may be bound in the same cover. It describes feedwater and service heaters, oil heaters and oil coolers, evaporators and distillers, condensing apparatus, cooling towers, cloth feed-water filters, twin strainers, expansion joints and anchors, water filters and softeners, centrifugal pumps and other Braun specialties.

BULLETIN 122 is the number of a handsome catalog recently issued by the Diamond Power Specialty Company of Detroit, Michigan. This catalog points out clearly the loss of heat transmission due to soot coating on boiler tubes and describes the detailed working of the Diamond Soot Blower.

WORTHINGTON TURBINE PUMPS is the title of one of the latest publications issued by the Worthington Pump and Machinery Corporation, of 115 Broadway, New York. This catalog describes the turbine pump for use against heavy heads, the principle of operation, the characteristics of turbine pumps, hydraulic balance, double-suction pumps, two-stage volute pumps, water works, mining, elevator and house pumps, fire pumps, boiler-feed pumps and sugarhouse pumps.

JAPAN FOR OCTOBER. The October issue of the Toyo Kisen Kaisha's handsome travel magazine, "Japan," contains two articles on shipbuilding in that country, ancient and modern, as its leading feature. The articles are handsomely illustrated with views of several of Japan's leading plants, and a clear insight is given of the progress being made in this line of industry.

BULLETINS Nos. 1 to 5, by Samuel L. Moore & Sons Corporation, Elizabeth, New Jersey. These bulletins picture and describe High Speed Compound Geared Reverse Link Winches, Dock Type Steam Gypsies, Dock Type Steam Capstans, "Moore" Automatic Screw Gear Steering Engines, and "Moore" Compound Geared Windlasses. Complete tables of capacities and dimensions are given in each case.

CHINA COMMERCE CLUB OF CALIFORNIA BY-LAWS. This club, which, as it name indicates, was formed recently for the promotion of foreign trade with China, has for officers the following well known business and shipping men: President, Robert Dollar; Vice-President, Charles H. Bentley; Vice-President, Louis Getz; Vice-President, Andrew Carrigan; Vice-President, E. O. McCormick; Treasurer, Seward B. McNear, and Secretary, Frank E. Hinckley. These gentlemen together with Messrs. E. A. Bernhard, L. R. Cofer, A. H. Cowen, J. T. Hendricks and E. W. Wilson make up the directorate.

MERCHANTS' ASSOCIATION OF NEW YORK 1917 YEAR BOOK. This is a 272-page book embodying the reports of the officers and different bureaus, alphabetical and classified lists of members, the by-laws and rules governing the body, and an account of the Association's achievements during the year.

CONTRACTOR'S EQUIPMENT, STEAM AND AIR MOTORS, PNEUMATIC HOISTS, AND MARINE MACHINERY are dealt with in Catalog No. 27, just issued by the Dake Engine Company of Grand Haven, Michigan. This catalog is a handsome and well arranged exposition of the machinery made by the Dake company. Among the articles of marine equipment illustrated and described are the Atwood Improved Steam Net Lifter, Dake Power Spud Hoists, Gangplank Hoists, Centrifugal Pumps, Blower Outfits, Dake Steam Anchor and Vertical Capstan Windlasses, Steam Deck Capstans, Steam and Hand Steering Gears, Electric Winches, etc. A part sheet for Dake motors, with instructions for ordering spare parts, a dimension sheet for Dake motors, and a telegraphic code covering the catalog designations of the different sizes and types of machines completes a catalog that leaves little to be desired in the way of typography or subject matter.

MASSACHUSETTS COMMISSION ON WATERWAYS AND PUBLIC LANDS. The first annual report of this commission, which includes the harbor and land commission and the directors of the port of Boston. This is a very complete review of harbor improvement activities during 1916 by the various communities of Massachusetts, and the report is well arranged and carefully indexed, and altogether is a splendid example of this type of publication.

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One 8x10. Globe Windlass, suitable for 1¾" Stud link chain. Arranged for capstan drive. In good condition.
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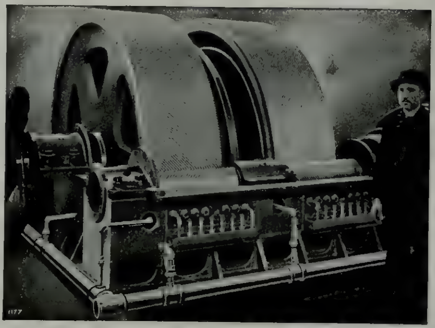

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Greater cargo-carrying capacity, measured both as space and weight, for the same speed, also

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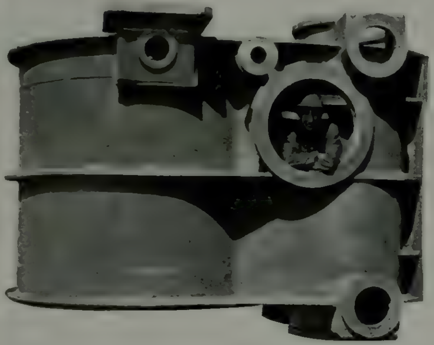

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ORDERS FOR McNAB DIRECTION INDICATORS RECEIVED RECENTLY

The McNab Company, of Bridgeport, Conn., is supplying a large number of their McNab Direction and Revolution Indicators to steamship owners who are having vessels under construction, as well as those who have steamships at present in service. Fleet orders have been received for the installation of this valuable instrument from the Clyde Steamship Company, Mallory Steamship Company, American Line, The Texas Company, Standard Oil Company of New York, Standard Oil Company of New Jersey, and many other equally prominent companies.

Many trans-Atlantic liners have just been equipped with the McNab Direction Indicators, as this instrument has proven of great service to the navigating officer in the deadly mine and submarine-infested waterways, as the safety of a ship depends on efficient navigation; an armed ship must maneuver into the most favorable position for defense against the enemy when attacked. If the ship is unarmed, her only hope of escape is in skillful handling, which means the absolute co-operation between the bridge and the engine-room departments.

It stands to reason, in either case, that if the captain or navigating officer can see by the eye that his orders to the engine-rom are being quickly and accurately carried out, such knowledge as this in these strenuous moments of tense excitement will inspire cooler judgmnt, better control, and much greater confidence in the handling of the vessel; the same applies to vessels navigating narrow or congested waterways.

The McNab Company has just received its new Indicator catalog from the press, illustrating the several types of indicators manufactured, and will be very pleased to send it to those interested, on request.

Commander Alexander McNab, Vice-President of the McNab Company, has sailed for England for the purpose of supplying a large amount of necessary steamship materials for new construction under contract by the United States Shipping Board, Emergency Fleet Corporation. The McNab Company has been the sole representative for a number of years for many prominent steamship appliance manufacturers, such as Messrs. Brown Brothers & Co., Ltd., of Edinburgh, Scotland, manufacturers of steam tiller and telemotor gears; Messrs. Chadburn's (Ship) Telegraph Company, Ltd., of Liverpool, England, manufacturers of world renowned ship's telegraphs; Messrs. J. Stone & Co., Ltd., of London, England, manufacturers of ship's ports, sidelights, decklights, navy white bronze and various other specialties for steamships. Therefore, they are practically in a position to supply everything for a modern steamship with the exception of the engines, boilers and hull. Should shipbuilders have difficulty in obtaining any classes of materials on this side of the Atlantic, the McNab Company will be very pleased to obtain same, giving reasonable quotations and deliveries.

Milburn Oxy-Acetylene Apparatus

Highest quality construction for long service and economical operation. Plants for every requirement from small portable repair outfits to large generating and compressing installations.

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SAN FRANCISCO, CAL.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912,

Of Pacific Marine Review, published monthly at San Francisco, California, November, 1917.

State of California, County of San Francisco—ss.

Before me, a Notary Public in and for the State and county aforesaid, personally appeared F. M. Dickie, who, having been duly sworn according to law, deposes and says that he is the Editor of the Pacific Marine Review, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse side of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Name of—	Post office address—
Publisher—J. S. Hines	576 Sacramento Street, San Francisco, California
Editor—F. M. Dickie	576 Sacramento Street, San Francisco, California
Managing Editor—F. M. Dickie	576 Sacramento Street, San Francisco, California
Business Managers—J. S. Hines and M. D. R. Hines	576 Sacramento St., San Francisco, Cal.

2. That the owners are: (Give names and addresses of individual owners, or, if a corporation, gives its name and the names and addresses of stockholders owning or holding 1 per cent or more of the total amount of stock.) J. S. Hines (Sole Owner), 576 Sacramento Street, San Francisco, Cal.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also, in cases where the stockholders or security holders appear upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom said trustee is acting, is given; also the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is (This information is required from daily publications only.)

F. M. DICKIE, Editor.

Sworn to and subscribed before me this 3rd day of October, 1917.

(Seal) S. I. Clark, Notary Public.

(My commission expires February 15, 1921.)

Is It Reliable?

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Yes. The reliability of a wireless set is determined by its simplicity and ruggedness. Cutting & Washington sets are the simplest on the market—they have few parts and no delicate adjustments.

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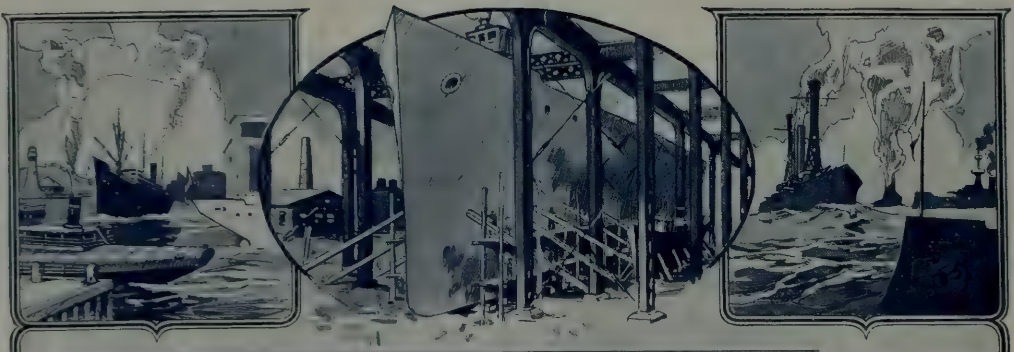
NOTICE TO READER. When you finish reading this magazine, place a one-cent stamp on this notice, hand same to any postal employee, and it will be placed in the hands of our soldiers or sailors at the front. No wrapping, no address.—A. S. Burleson, Postmaster General.

PACIFIC MARINE REVIEW

December
1917

Shipbuilding in Japan
Panama Canal Lockages
Shipping Board Changes
California's Concrete Ship



Linde Oxygen—Service to Pacific Coast Ship Yards

THE abnormal increase in the Oxygen requirements of Pacific Coast ship yards during the past year has put Linde service to a mighty test.

To meet the issue we have rushed to completion a second manufacturing unit at San Francisco and another at Los Angeles—tripling our output at each of these points. With equal speed, we are now working night and day on a huge capacity plant at Seattle.

The completion of the last of these extensions a few weeks hence means that we will have, through super effort in the face of great obstacles, increased our manufacturing facilities in the coast district over nine hundred per cent in eighteen months.

And—between times, to meet the strain on these coast stations, we have been maintaining stocks through relief shipments from supporting Linde oxygen plants as far east as Chicago, St. Louis and Milwaukee.

These relief shipments which have totaled over two hundred cars to date have been brought forward in the face of extra shipping expense averaging over ten thousand dollars per month.

We believe that all shipyard operators will appreciate the strength and flexibility of this unusual service as a practical guarantee of our ability to supply the oxygen requirements of Linde patrons under any conditions which these abnormal times may develop.

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LINDE
OXYGEN
LINDE
THE LINDE AIR PRODUCTS CO

PACIFIC MARINE REVIEW
The National Magazine of Shipping

VOL. XIV, No. 12 SAN FRANCISCO DECEMBER, 1917

The Season's Responsibilities

NEVER has our country been called upon to meet a more serious and thoughtful holiday season. "Peace on earth, good will to men" seems far away this year, but its outlines glimpsed fitfully through the smoke of battle and the grim shadows of death and destruction should be infinitely more precious to our hearts. We, as a nation, have pledged ourselves to cleanse every spot and tarnish from this symbolism of mercy, justice and righteousness and if it please God that this cleansing must be done with the best blood of our land, then let us thank our Creator that He has given us the strength and courage to set about our appointed task.

To those who have gone from our midst to uphold the hands of right against those of might, to replace the insane doctrines of slavery, terrorism and savagery with those of justice, mercy and enlightenment we would wish a speedy completion of their labor. Let us dedicate the words of our mouths, the thoughts of our minds, the work of our hands and the entire substance of our worldly possessions to the furtherance of this task and let those at the front fully realize that we are jealous of their lot and that no sacrifice is too great when being made on their behalf.

This then is the thought we would leave with every reader who is a true American; that he enter upon this holiday season with the determination that he will so use every energy and faculty of which he is possessed that when another Christmastide has come the sun will rise upon a world rededicated to the usages of peace, humanity and fair dealing.

May your Christmas be filled with the inner happiness of Sacrifice and your New Year be illumined by the beacon of Hope, for Freedom is stronger than tyranny, nay it is even stronger than death—and Freedom shall prevail.

A Vast Japanese Enterprise

For the use of pictures and text herewith we are indebted to "Japan" and the Toyo Kisen Kaisha Steamship Company

IN these days of worldwide unrest and industrial upheaval, when every man is called upon to serve in some capacity or other, many phases of character are seen. Some men go into military or naval service, others are called upon to devote their special abilities to work for their governments, while others, without any assistance from the outside and sometimes, in the face of great obstacles, go on in their own way developing vast industries, producing goods that are needed, and giving employment to tens of thousands, thus becoming potential factors for the benefit of humanity.

Such is the example set by Soichiro Asano, head of the Asano Shipbuilding Company of Japan. Mr. Asano is one of Japan's most prominent "captains of industry." In fact, so conspicuous is he, in industrial circles, that, to carry the military simile further (and military phrases seem popular now) he might well be called the "Chief of Staff" of Japanese shipping industry.

In the brief space of twenty years, Mr. Asano has built up the fleet of the Toyo Kisen Kaisha (Oriental Steamship Company) from a single vessel to six giant passenger liners and as many more great cargo carriers. He introduced competition into the trans-Pacific Service and brought it up to its present state of excellence. He also inaugurated the direct steamer service between Japan and the West Coast of South America, thus developing a rich commercial field for Japanese enterprise.

A general view of the fabricating yards of the plant of the Asano Shipbuilding Company.

Yet, with all these tremendous responsibilities on his hands, Mr. Asano had a great and a patriotic ambition in that busy brain of his. He was not content merely to operate the great fleet of splendid ships sailing under his own house flag and that of the Rising Sun. He wanted more than that. He wanted not only to operate, but also to build, these great vessels in his own yard. His keen mind saw that, in the future, the country that was able to build, as well as to operate ships, was the country that would be prosperous. He realized that each new shipyard erected was of untold advantage industrially to Japan, and he decided that he would organize his own shipbuilding company to construct the vessels for his services.

It was several years, however, before opportunity came for carrying out these plans. There was a suitable location for the plant to be secured, plans to be drawn and a thousand and one things to be considered.

In July, 1916, the site at Tsurimi near Yokohama, was selected. At that time, this was merely a wide, fine, sandy beach, which even the most vivid imagination would have difficulty in turning into a shipyard. Engineers, however, declared it to be the finest site in all Japan and the wisdom of the selection has been fully proved. As soon as the choice was made development work was started. Giant sand pumps and dredgers were installed and the task of filling in the entire area to a height of six feet above the original beach was begun.

By the end of 1916 nearly all of the shop buildings were completed and the greater part of the heavy machines had been erected in position. On February 11, 1917, the keel of the first ship was laid with impressive ceremonies and the first hull was launched in July, 1917.

The shop buildings, fitting-out basin, building berths, etc., which are now completed, cover an area of approximately 250 acres. This is the first unit to be completed, but adjoining ground of practically equal area has been secured and the plans contemplate the erection of other building facilities to cover the same as rapidly as possible. These will include new steel plant, boiler and engine works, etc. The shops and buildings now in use cover an area of approximately 30,000 square yards, while the fitting-out basin, into which the ships are launched and in which they remain while being equipped, is about the same size as the harbor of Honolulu. There are six reinforced concrete building berths, 600 feet long, now completed and in use. The plans call for an additional set of four reinforced-concrete berths 800 feet long, and two more 500 feet in length. These will give an estimated output, under normal conditions of steel supply, of two vessels of 11,000 tons deadweight per year per building berth. This means twenty boats of 11,000 tons deadweight capacity, or about 8,300 gross tonnage, or a total capacity for the ten berths of nearly 170,000 gross tons per year.

View looking towards the upper ends of building berths.

One great outstanding feature in the equipment of this yard, which is of particular interest to Japanese and foreigners alike, is the fact that all the heavy machines, with the exception of one or two, were made in Japan. These machines are of such size and capacity as to be able to handle the assembling of machinery and the equipping of vessels up to 30,000 gross tons in size.

The transportation of materials throughout the yards and in the shops is accomplished by electrically driven apparatus. There are three electrically driven recolving tower cranes placed between every two alternate berths. These cranes have booms of 105 to 115 feet radius at a height of 150 feet from the ground and are so arranged that three of them in a row cover every part of the hull of a ship on both sides during her construction. Transportation of materials in the yards and shops is provided by ten 3-ton locomotive cranes, five 6-ton traveling cranes with 68-foot spans, these serving both storage space and fabricating yards. The fabricating yard is in the open air, where the keel benders, flanging machines, heavy plate rolling machines, joggling machines, hydraulic manhole punches, etc., are situated.

In addition to the handling equipment already mentioned, there are three 3 to 6-ton overhead traveling cranes in the ironworking shops. These are arranged to bring in materials from the outside or to shift same about the interior of the shops. At the fitting-out wharf there is an 80-ton crane for loading engines and boilers into the hulls of vessels; in fact, it is evident at every point that care has been taken to secure the most modern time and labor saving devices known to the science of shipbuilding.

In addition to this great plant at Tsurume, Mr. Asano has also acquired another shipbuilding establishment at Osaka, the great industrial center of the Japanese Empire. This is known as the Osaka Kausani Iron Works. It has five building berths which are equipped to handle ships of from two thousand to three thousand tons gross register.

The first unit of the great plant at Tsurume, is described above, and, as shown by the engravings in these columns, is now complete and in active operation. Plans for future development of adjoining acreage have been worked out, and these include the installation of steel plate rolling mills, marine engine and boiler works, together with a floating drydock of sufficient size to accommodate the largest passenger liner or a battleship of the most modern type.

AN ANCIENT JAPANESE INDUSTRY

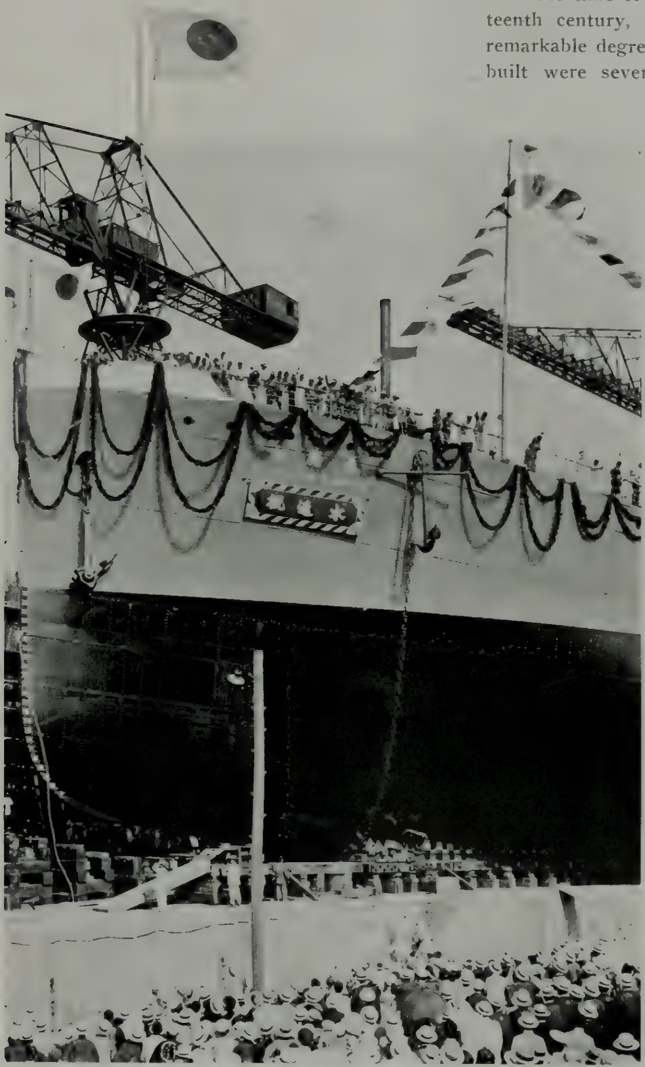
By Stephen Sharrock

SHIPBUILDING is not a new industry in Japan, except in the sense that the building of modern ships is new, just as it is new in all countries. The steel ship is a development of the past few years, and Japan was only a little behind other countries in taking up this form of construction. Japan has always built wooden ships. No matter how far back into Japanese history we go, we find the Japanese successfully building and operating them. It was natural that an island country with long coast lines and a mountainous interior should develop a race of seafaring men. Just when they began or what the evolution was, no one pretends to say. Probably they began, as other nations began, with a rude raft of logs lashed together, followed by the hollowed trunk of a tree as the first canoe. The building of ships began at such a remote period that no one is certain just what is the meaning of "Maru," the word which is attached to the names of all Japanese ships, as "Tenyo Maru," "Shinyo Maru," etc. In his "Things Japanese," Chamberlain explains that it may be a corruption of a word now obsolete and that is about as near to an explanation as anyone has made. Maru means "round", and it has been suggested that it has survived from a time when all boats were round, like a tub, or like the boats still in use on the Tigris and Euphrates at Bagdad. The word is attached to the names of all merchant ships.

Scene at the launching of the "Hakusika Maru."

The building of ships in Japan had progressed so successfully that in 1185, when the Taira and Minamoto clans met at Dan-no-ura for the decisive sea battle in which the former were completely vanquished, more than one thousand battle ships were engaged. The Taira clan, driven to the seacoast by their enemies, had taken refuge in their fleet of ships, about five hundred in number, on which not only the warriors but the women and children as well were placed. They were attacked by the seven hundred junks of the Minamoto clan, and the battle fought is one of the most famous in Japan's long history. The ancient Dan-no-ura was near the present city of Shimonoseki. Later a great fleet was used in the famous expedition of Hidegoshi to Korea.

About one hundred years after the Dan-no-ura battle the great Kublai Kahn, the Mongol monarch who had become master of China, set out to conquer Japan, and sent on this mission a giant armada of 3500 ships, which had long been building for this task. The Japanese had been warned of his coming, and a policy of preparedness had given them a large number of new vessels, while junks from all parts of the kingdom had been brought into what we now call the naval reserve. The Japanese boats were the fleetest, and they adopted a policy of singling out isolated vessels of the invading fleet, surrounding them, and destroying the crew. This policy was successful, and the attack was repulsed with a decisive victory.

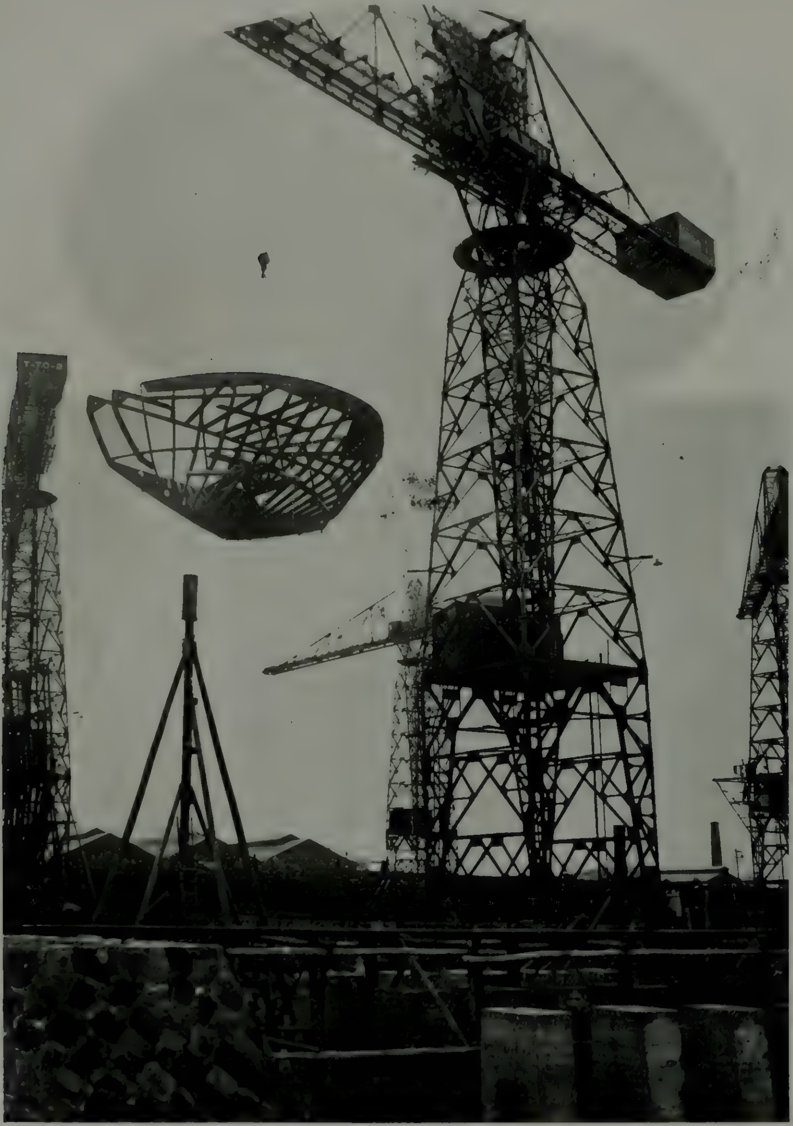


An event which drew thousands of spectators.

In the time of Hideyoshi, at the end of the sixteenth century, shipbuilding had developed to a remarkable degree of perfection. The vessels then built were several times the size of the junks which are now seen on the coasts and in the rivers of China and Japan, and were much superior in construction and workmanship. Drawings of the Japanese ships of that day show that they were larger and of better build than those with which Columbus crossed the Atlantic to discover America, and were about equal to the Portuguese and Dutch vessels of that time. Further impetus to the development of Japanese shipping was given in 1600 with the arrival of Will Adams, the English pilot, who remained in Japan until his death and taught the Japanese shipbuilders all that he knew. Adams took command in several lengthy voyages and helped to build up Japan's foreign trade. The English ideas of shipbuilding which Adams was able to contribute enabled them to build even larger and better ships than before.

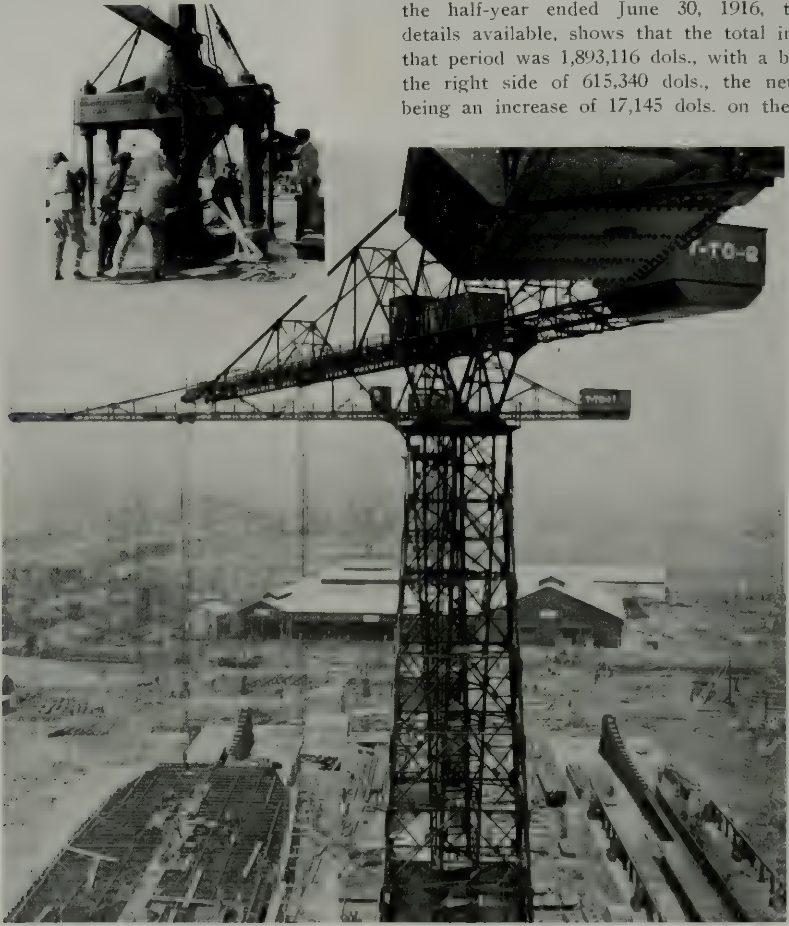
It was during this time that Japanese navigators, though practically unknown to Europe, made a name for themselves by their achievements in the Pacific and the Far Eastern waters. Japanese ships made frequent voyages to the Philippines, some of them having built up a large trade there before the discovery of the Philippines by the Europeans. Other Japanese vessels sailed to Korea, South China, Siam, Java, and India, while there is on record at least one voyage to Mexico.

During those days Japanese shipping was known throughout the Far East, and Japanese navigators were justly famous for their skill and daring. Japanese settlements were formed in Korea, Siam and the Philippines, and Japanese traders followed the shipping routes and established important trading centers. The life of one of the Japanese navigators of that day reads like a tale from the Arabian Nights. Yamada Nagamasa, who was also known as Tenjiko Hachibei, sailed a vessel between Japanese and Siamese ports and became well acquainted in the latter country. He soon rose to a position of great importance and unwittingly gained the affections of the Queen, who poisoned her youthful consort in order to marry the Japanese skipper. Yamada did not return the Queen's love. He did marry a royal princess and became viceroy of an important Siamese province, only to die of poison secretly given him by the jilted Queen.



This picture gives an excellent idea of the extent and capacity of the crane equipment in this great Japanese shipyard. The crane in the foreground is handling the counter framing for a large steamer.

About 1636 Japanese shipping was at the height of its development, when the policy of exclusion was adopted by the shogun rulers of Japan. Foreigners were expelled from the country, and while no foreigners were allowed to visit Japan, there were equally stringent rules to forbid Japanese going to other countries. In order to put an end to the activities of the brave navigators, all of the three-masted ships engaged in foreign trade were ordered broken up, only two of them being preserved, as mementoes, by the shogun's commissioner of marine. After that the law forbade the building of any but very small junks, suitable only for the coasting trade and so constructed that it was unsafe to attempt long sea voyages in them. For two centuries Japanese shipping remained undeveloped and it was not until the Restoration that the industry was revived and given the aid and protection of the Japanese government.


An electric bending machine is shown in the insert, while below we have a "close up" of one of the many great tower cranes with which this great yard is equipped.

Maritime Matters in Singapore

Owing to the great importance of shipping, more than passing reference is due to the extensive harbor improvements lately completed at Singapore, says a United States report from the Singapore Consulate-General.

Singapore may properly be termed the principal shipping port for the Far Eastern tropics, as it is the distributing port for the Malay Peninsula, a great portion of the Netherlands East Indies, and an extensive area of Indo-China, these being the leading sources from which its vast trade comes and to which the trade through it goes.

The report of the Singapore Harbor Board for the half-year ended June 30, 1916, the latest details available, shows that the total income for that period was 1,893,116 dols., with a balance on the right side of 615,340 dols., the net revenue being an increase of 17,145 dols. on the previous half-year and of 130,784 dols. above the average of the preceding 21 half-years. Of the balance of 615,340 dols., interest was paid or was due the government on cash received from loan funds to the extent of 568,547 dols., and the remainder, 46,793 dols., was carried forward. The above figures give some indication of the flourishing nature of the trade of Singapore and also of the business acumen and forward policy of the Singapore Harbor Board, which has the supervision of the whole of the docks and wharves of Singapore on behalf of the Straits Settlements Government.

In 1906 the gross revenues for the year was 2,734,443 dols. In 1910 the turnover was 2,727,-712 dols., so that in 1915, when it rose to 3,379,-432 dols. for the year and again to 1,893,116 dols. for the first half of 1916, there is further evidence of progress.

In the first half of 1916, in spite of the war, the total net registered tonnage of the vessels using the wharves was 2,130,418, as compared with 2,321,535 tons for the corresponding period in 1910, while the half-year's tonnage of cargo dealt with was—inward 677,214 tons against 678,-542 tons in 1910, and outward 507,935 tons compared with 524,427 in 1910. In the year 1914 the construction of the new wharves gave the harbor a great increase in wharfage with a depth of between 30 and 33 feet.

The craft owned by the Singapore Harbor Board are: Wharf Department, 7 tugs and launches, 6 transhipment lighters, 2 steam lighters, 3 crane lighters and pontoon, a man grab on steel per barges, 1 Priest- bucket dredger, 6 hop-pontoon, and 1 grab on wooden pontoon. Lighterage Department: 3 launches, 14 steel lighters of 70 tons capacity each, 18 wood lighters of 70 tons capacity, 44 wood lighters of 40 tons capacity, and 7 wood lighters of 20 tons capacity. Dockyard Department: 7 launches.

Powerful shearing machines are located at frequent intervals about the fabrication yards.

There is now completed a vast scheme of improvement of the property comprising: (1) Telok Ayer Section: Construction of a quay wall from Johnston's Pier to Malay Point, 5028 lineal feet; depth alongside at low water, 18 ft. (2) Tanjong Pagar Section: Reconstruction of the main timber wharves from Tanjong Pagar to Jardine's Wharf by a massive concrete blockwork wall, or by steel-girder work on wrought-iron cylinders, 8 feet in diameter, filled with concrete. The construction of a tidal basin or wet dock of 24½ acres and a minimum depth of 30 feet, opened to traffic in June, 1914. (3) Keppel Harbor Section: A new graving dock at Keppel Harbor, 879 feet long, and divided by an intermediate caisson into two docks of 486 and 325 feet each. The entrance is 100 feet wide. This dock was opened to traffic in August, 1913.

The Lagoon Wet Dock has an area of 24½ acres, 3695 feet length of deep-water quayage and 1900 feet length of stepped quayage for lighters and small craft. The arrangements of the dock allow of its being enlarged to 35 acres, with 5762 feet of deep-water quayage. The depth of high water at ordinary spring tides is 39 feet and at low tides 30 feet, but the walls are so designed as to permit of this being increased to 33 feet. The height of the walls from the dock bottom to the coping level is 43 feet, and there is 33 feet of water in the entrance at low spring tides. The entrance is 500 feet wide and the entrance walls are each 400 feet long. The quays around the dock are 45 feet wide, the go-downs cover 200,400 square feet and can store 45,000 tons of general cargo. Fresh water is laid on throughout the quays and the whole is provided with electric light and power.

This dock was opened for traffic on June 2, 1914, and is being used by some of the largest vessels visiting the Far East. It has storage room for 139,700 tons of coal at one time. The roads around the dock are 75 feet wide, and the amount of earth excavated was 1,863,163 cubic yards, which has been used to reclaim another 150 acres which were formerly a tidal swamp.

The approach to the harbor is described as being one of the most beautiful in the world, and probably only Rio de Janeiro, Sydney (Australia), and, perhaps, Colombo, in any way surpass the panorama of views. The harbor is practically landlocked by islands, and these afford such a protection that until the work for the new wharves and docks was begun a few years ago the berthing accommodation consisted only of wooden wharves on wooden piles, and even with these a great volume of trade was done.

Singapore is a center for ships' repairs, and it has, as already stated, five graving docks, which are constantly in use.

The board's railway rolling stock consists of five locomotives and 211 wagons.

The extent of the coal trade of Singapore may be judged from the figures which give the quantities of coal handled, inward and outward, over the Singapore Harbor Board's wharves for the past ten years, representing an average of about 570,000 tons received and re-delivered to vessels, or in the aggregate a total of 1,140,000 tons passing over the wharves every year: 1906, 1,205,580 tons; 1907, 1,111,682 tons; 1908, 1,145,435; 1909, 981,977; 1910, 1,063,768; 1911, 1,084,976; 1912, 1,200,545; 1913, 1,338,495; 1914, 1,248,032; 1915, 1,021,452; first half of 1916, 519,994 tons.

The following are the principal classes of coal of which stocks are stored on the Singapore Harbor Board's premises: Welsh, Japanese, India, Australian, New Zealand, Chinese, Manchurian and a variety of supplies from local sources such as Borneo, Sumatra, Labuan and Sarawak. The stocks range between 100,000 and 150,000 tons, and as soon as the improvements are complete there will be room for upwards of 200,000 tons.

At present there are no mechanical appliances for moving the coal, and the whole of the work is done by Chinese coolies. The system is for each two coolies to carry a basket containing 160 pounds of coal from the ship to the stack or vice versa. The labor is paid at so much per basket, varying in rate according to the distance covered. The special feature of this method is that bunkering operations can be carried on at the same time as cargo is being loaded or unloaded, thus accelerating the dispatch of steamers from the wharves. The average rate of removal of coal is about 100 tons an hour. A record for bunkering is held by Singapore with 1510 tons—21,000 baskets—placed aboard a single vessel in five hours.—Liverpool Journal of Commerce.

WOODEN SHIPS FOR NEUTRALS

Our Northwestern wooden shipbuilding industry is making a strong protest against the partial embargo that has been placed on building ships to the order of citizens of neutral countries. It is held that if the Shipping Board has seen fit to curtail the letting of contracts for wooden hulls that those concerns which have invested capital in plants in the expectation of receiving Government contracts should be allowed to secure work from friendly neutrals. That there is a great measure of justice in this request no one can successfully deny. If the Government has now on order all the wooden hulls that it believes can advantageously be used there seems to be no valid reason why wooden shipyards, not engaged on Government orders, should not be allowed to seek foreign business, always provided, however, that such orders would interfere in no way with the speedy completion of Government ships or cause any curtailment of the labor supply necessary for the consummation of the Shipping Board's program.

CONSCRIPTING SHIP TIMBER

Every stick of Southern pine convertible into shipbuilding materials has been conscripted by the Federal Government in an effort to speed up the wooden fleet program. Official admission by the Washington authorities and representatives of the lumber industry that greater progress in shipbuilding will be necessary to meet the growing deficiency in world tonnage is followed by announcement that the Government will send men South to watch every saw mill and see that timbers which can be put to war service are not diverted into domestic trade.

"In order to compel mills which are not inclined to help out, an embargo will be placed by the Government upon every stick thicker than two inches, wider than ten inches and longer than twenty feet, which can be applied to the ship schedule," says a bulletin issued by the Southern Pine Emergency Bureau, to all manufacturers of Southern pine.

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R. E. HANLY . . . . . . Advertising Manager
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OVERTIME AND COSTS

THE ratio of overtime wage rates to regular hourly rates forms no basis on which to judge the cost of doing work during regular hours and under overtime conditions. This statement will be borne out by a study of labor costs in any shipyard where a large amount of overtime work is going on. When a man works twelve hours and receives two days' pay therefor, it is a very exceptional case where a day and one-half's work is delivered. This is especially true where the overtime work is performed at night. We believe that there is quite an appreciable difference between the efficiency of a daylight crew and a night crew where the two sets of men are working under normally the same conditions and the same number of hours, and this difference, of course, is in the favor of the daylight workers. How much greater must the difference be, then, when a man who has done a day's work starts in on a four-hour overtime stunt at night? Entirely aside from the increased hourly rate that is paid for overtime work, the practice is a costly one for the employer, results in a poor return as far as output is concerned, is a fruitful cause of labor disputes, and offers such a slight help in the problem of speedy production that it should only be resorted to in cases of great emergency. It is probably true that most shipyard managers realize the costliness of overtime, and the fact that it is so much practiced is a sure indication of the shortage of skilled labor for the shipyards of the Pacific Coast.

USE THE MARINE RAILWAYS

IT would appear that the Shipping Board in calling for bids on the installation of machinery has issued a circular stating that the Emergency Fleet Corporation does not favor the use of marine railways for the purpose of docking these ships.

Such a decision in reference to marine railways points to a reasoning that may be well termed narrow. To condemn the marine railway for the docking of the smaller units of the Emergency Fleet Corporation's vessels is on a par with the reasoning of a man who would destroy all horse flesh because the creature was sometimes used for the immoral purpose of horse racing.

The danger of straining a ship on a well constructed marine railway dry dock is practically nil—the danger of subjecting a hull to unequal strains in a marine railway with inadequate foundations is, of course, present and the most ardent advocate of the marine railway form of dock will cheerfully admit this. But is the sectional floating dry dock in a different category? We think not. The floating dock built up out of sections may subject a hull to very severe strains through inequality of pumping in the different sections and this risk is certainly applicable to the sectional floating dock to a greater degree than to a well constructed marine railway.

The Navy Department has been docking torpedo-boat destroyers on marine railways and no vessel requires gentler handling in a dock than these light structures, furthermore the Department is now preparing to install several Crandall railway docks at some of the navy yards and these structures will be designed to handle vessels up to 350 feet in length.

In the light of these facts, the decision of the Shipping Board authorities seems to be rather shortsighted as the steadily increasing output of Emergency Fleet Corporation vessels added to the ordinary uses of docks by the present merchant fleet will very shortly tax the docking facilities of the United States to the utmost and to eliminate the large number of first-class marine railways now in use would surely result in vexatious delays.

THE MOTORSHIP SITUATION

IN the Daily Marine Record of November 5, 1917, appeared the following, under the caption, No Motorship Orders: "Motor orders are not being repeated by the Shipping Board. Many motorships are now being built, but no new contracts are being made. The claim is advanced that this country will be handicapped after the war in competition with European engine cruisers if there is an excess of the motorships."

The intended meaning of this paragraph is a little obscure. We were not aware that the Shipping Board had ordered any motorships at all. "Many motorships are being built, but no new contracts are being made." This statement is partly true as only a few motorship orders are being placed at this time, but the first half of the statement explains the last half. Not many motorships are being ordered because a good number are now being built and in a great many cases the ship when completed has had to wait a long period and operate as a sailing vessel or a tow barge while waiting for her engines to be delivered. There are only a few firms making marine heavy oil engines in the United States and these firms have found it practically impossible to keep up with their orders. These builders are in somewhat the same position as the makers of geared turbine marine units. The demand for geared turbines is so heavy that the question of delivery assumed very formidable proportions and in the meanwhile the makers of reciprocating engines had managed to catch up a bit on their orders and offer reasonable delivery, and the result has been a swing of the pendulum of supply and demand back to this type of drive.

In the latter sentence of the paragraph quoted above, the writer evidently refers to the wooden ship types undertaken by the Emergency Fleet Corporation and also to the wooden vessels of the ocean going type now being built from one end of the coast of the United States to the other. It seems to us that the writer is far at sea in his conclusion here. A wooden steamer of 2500 tons deadweight capacity should be able to compete successfully with a steel cargo steamer of the same size, but, unfortunately for the wooden ship, that is not the type of steel vessel she is usually called upon to compete with. If we take a 10,000 ton deadweight capacity steel steamer on a route where there would be reasonable assurance of full cargoes, four wooden steamers of 2500 tons deadweight capacity each would have no chance at all in competition with her. This fact naturally restricts the normal use of the small wooden carrier to a marked degree. The question is one entirely of the cost of transportating freight per ton per mile. The use of internal combustion engines as motive power decreases this cost and therefore naturally enlarges the competitive sphere for the wooden ship. For this reason we are inclined to believe that an excess of motorships among the smaller units of our ocean going marine would place us in a better position to meet European post bellum competition rather than handicap us.

THE NEW SHIPPING BOARD MEMBER

THE appointment of Mr. Charles R. Page to the Shipping Board is an Administration move that should be highly gratifying to the Pacific Coast. In the matters of ship valuation, charter equities, and marine insurance Mr. Page is well fitted to assist the Shipping Board, and his appointment certainly strengthens that body. Again, the appointment cannot be designated as holding any political significance, as Mr. Page's political activities were merely those of the everyday citizen, and even in San Francisco there were very few people who knew whether he was a Republican or a Democrat. The kind of shipping knowledge possessed by the new member of the Shipping Board is exactly what was needed to make that body complete and well balanced, and for this reason President Wilson is to be heartily congratulated on his choice of a Western member. With Admiral Capps in charge of the building program and the present Shipping Board in charge of operation and general management, the great marine achievement which the country has mapped out for itself should be speedily carried to a satisfactory conclusion.

WAR LIMITS THE ESTABLISHMENT OF NEW INDUSTRIES

THE recommendations of the Council of National Defense that no new industrial enterprise should be undertaken at this time which will not help win the war will be of far-reaching effect to business men, according to a bulletin issued by the committee of the Chamber of Commerce of the United States co-operating with the Council of National Defense. The committee declares every man who wants to see the United States victorious has now this recommendation as an acid test to apply to any new enterprise or undertaking.

In fact, this action, according to Waddill Catchings, of New York, chairman of the committee, should prepare the minds of the business men for similar action in regard to the full operation of those industries not essential to the national defense and to the consumption by the public of luxuries and non-essentials.

"In the course of time," Mr. Catchings went on, "no one need be surprised if during the war the use of labor and materials for all unessential purposes is made impossible by regulation or statute."

The following is the recommendation in full as made by the Council of National Defense:

"Every effort that this country is capable of making should be applied to bring the war to a speedy and satisfactory conclusion. The resources of the country in a general way may be said to consist of men, money and material, and during the period of the war any new enterprise or undertaking should be tried and justified by the test: Will the men, money and material so applied best contribute in this way to the winning of the war?

"New enterprises which are not fundamental to the efficient operation of the country's necessary activities should not be undertaken. This will not result adversely upon business or conditions of employment, because every man and every resource will be needed during the war. All effort should be centered to help win the war."

There is no ambiguity about this recommendation, according to the National Chamber committee. Men who are considering new enterprises, public improvements, dwellings, factories, in fact industrial work of every description, should be guided by the question of whether or not the undertaking is to be a factor in the victorious conclusion of the war. This is the concluding message to the commercial leaders of the country.

SHIPPING BOARD CHANGES

MR. CHARLES PIEZ of Chicago, President of the Link Belt Company, has been named as a vice-president of the Emergenecy Fleet Corporation. James Heyworth, a Chicago contractor; A. J. Mason, a Chicago engineer; Charles Day, a Philadelphia contractor; Frank Kirby of New York and John Burton Payne, a Chicago lawyer, have also been named as new connections of the Corporation although the definite duties of the six men are not quite clear and the effect upon the scope of the duties of Admiral Capps has not been announced.

The Shipping Board and the Emergency Fleet Corporation have been laboring under the results of a good deal of unfortunate publicity of a wild cat nature. Press stories have been published broadcast in which shipping in million ton units was referred to as something that could be created out of moonshine by the mere waving of a wand by some wizard and everything would be all right as soon as we secured the right wizard.

Mr. Piez is a noted efficiency engineer and may be able to perform a miracle by making one man in a shipyard take the place of two, but we doubt it. The speeding up of work in our shipyards is a matter of securing material and labor on the one hand and doing away with every shred of red tape possible on the other. We believe that the only honest criticism of Admiral Capps' conduct of the building program of the Emergency Fleet Corporation can be in regard to saddling naval methods of inspection, navy systems of progress reports and general naval exactitude in regard to details. Naturally the intricate reports required by these methods of procedure were over the heads of the great majority of the civilian inspection forces provided by the Shipping Board and resulted in costly delays and misunderstandings in regard to payments. The added managerial forces at Washington may take full advantage of their opportunity to simplify all this proceedure and if they do this much better service will be secured from all the shipyards as a heavy load will be removed from the managers of plants and they will feel at liberty to devote their entire energies to turning out tonnage as fast as possible.

BRITISH SHIPPING CONTROL

I LEARN upon good authority that it is the intention of the British Government to retain control of the shipping, shipbuilding, and kindred industries for a considerable period after the conclusion of hostilities. Originally it was intended that private firms should be freed from Government control six months after the declaration of peace, but it is now said that it is he intention of the Government to extend this period to one or two years. Shipbuilders view the prospect with considerable alarm, and have taken steps to point out to the Government that at considerable expense they have enlarged their yards and increased their plant in order to meet the present demand for new shipping. They contend that if the Government retains control of shipping until two years after the war they will be prevented from participating in the boom which might follow. The neutrals, they say, will reap the benefits. The Government attitude regarding the nationalization of shipping is also causing considerable uneasiness. Shipbuilders complain that they could easily increase their output if the Government would grant facilities in the way of obtaining more steel and labor. It is stated that General Collard has under consideration a scheme for the equipment of a number of slipways and yards to be run as Government undertakings. It is understood that the reason underlying the Government's attitude is that a hold should be retained on shipping and shipbuilding, at all events during the early stages of demobilization, and also to prevent Germany from obtaining ships from British yards through neutral orders until the requirements of Britain and her Allies have been fully met. Already the shipbuilders are flooded with orders for new vessels for post-war delivery. During the first half of October alone orders for more than 100 ships have been received by Northeast Coast and Clyde shipbuilders.

Interesting Lockages Through the Panama Canal

By Frank A. Stanley

Fig. 10.

ON the following pages will be found illustrations representing the lockage through the Panama Canal of various types of evssels and floating equipment of one kind or another. These tell their own story pretty distinctly, making unnecessary any extended descriptive text, although a brief explanation of certain of the views may not be out of place.

The Panama Canal, itself a spectacular work of the broadest interest to engineers, and in fact to all others who follow the progress of the world's great undertakings, assumes today under the conditions imposed by the war an importance that its builders themselves could hardly have anticipated prior to the actual outbreak of hostilities. For this reason it is taken for granted that the photographic views here reproduced showing the passage at various times of ships and equipment through the locks and canal proper will be of general and timely interest.

The view shown in Figure 1 illustrates the first steamer to pass through the canal upon its opening to commercial vessels. The ship shown is the "Ancon," and the view was taken while the steamer was passing through the lower west chamber of Gatun locks. At the right-hand side of the photograph will be noticed one of the six electric locomotives that are customarily used in handling ships through the lock chambers. With three of these locomotives on each side of a vessel, two of the six are employed for towing through the locks, while two abreast of the hull and two in the rear are used to check the headway and stop the vessel before the lock gates are reached.

Figures 2 and 3 are striking views, taken before the canal was opened to commercial navigation, and show the manner in which an entire fleet of floating equipment in the line of dredgers, tugboats, barges and scows was passed through the locks. The first of these pictures represents the dredger fleet at Pedro Miguel locks on its way to work on the Cucarache slides; the second view of the dredger fleet shows it entering one of the lower locks at Gatun.

Figure 4 represents a still more interesting lockage, this view being of particular interest to West Coast readers, as it represents the passage of several hundred 85-foot piles through the Pedro Miguel locks. The piles were rafted from Balboa, at the Pacific end of the canal, and are on their way to the east breakwater in Colon harbor, the Atlantic terminus of the waterway.

Another view taken at Pedro Miguel locks is reproduced in Figure 5 to illustrate the simultaneous locking of two ships in opposite directions. The vessel in the east chamber to the right is going north, the one in the west chamber south. The ship in the east chamber is being elevated by the water in the lock to the level of the waterway beyond the gates, while the other vessel must be lowered by letting the water out of the west chamber till the level of the water downstream is reached. It will be noticed that the fender chains are drawn up across each lock, a position the chains will hold until the water-level in the locks has been altered to a point where the gates may be opened and the ships passed out. The fender chain in front of the vessel in the lock chamber to the left is a precaution against the ship coming too far forward when brought into the lock, thus preventing the possibility of injuring or carrying away the gates. The chain at the stern of the steamer in the lock chamber to the left provides a similar safeguard against trouble that might ensue were engine-room signals to be misunderstood and the ship be backed for any distance.

The general view, Figure 6, was taken at the Pedro Miguel locks and shows a group of vessels tied up at the north approach wall waiting for the slides at Culebra Cut to be cleared, in the fall of 1916.

Naturally, at this time the canal holds a great interest in respect to its utility in quickly shifting naval vessels from Pacific to Atlantic stations, and vice versa. Figure 7 shows the United States battleship "Ohio" in the middle east chamber of Gatun locks on her way to the Pacific in the summer of 1915. Four electric locomotives are utilized on each side of these heavy ships, whereas six are usually used on a freighter and four on smaller craft.

Figure 8 is another view of the battleship "Ohio" passing Cucarache slide. This is one of the most narrow and winding points along the canal.

Another battleship, the U. S. S. "Wisconsin," is represented in the upper east chamber of the Gatun locks in Figure 9. This view shows not only the application of the towing locomotives on the lock walls, but also brings out the appearance and relative positions of the guard gates and main gates of this upper lock chamber.

A third battleship, the U. S. S. "Missouri," is shown in Figure 10 passing a point just north of Gold Hill.

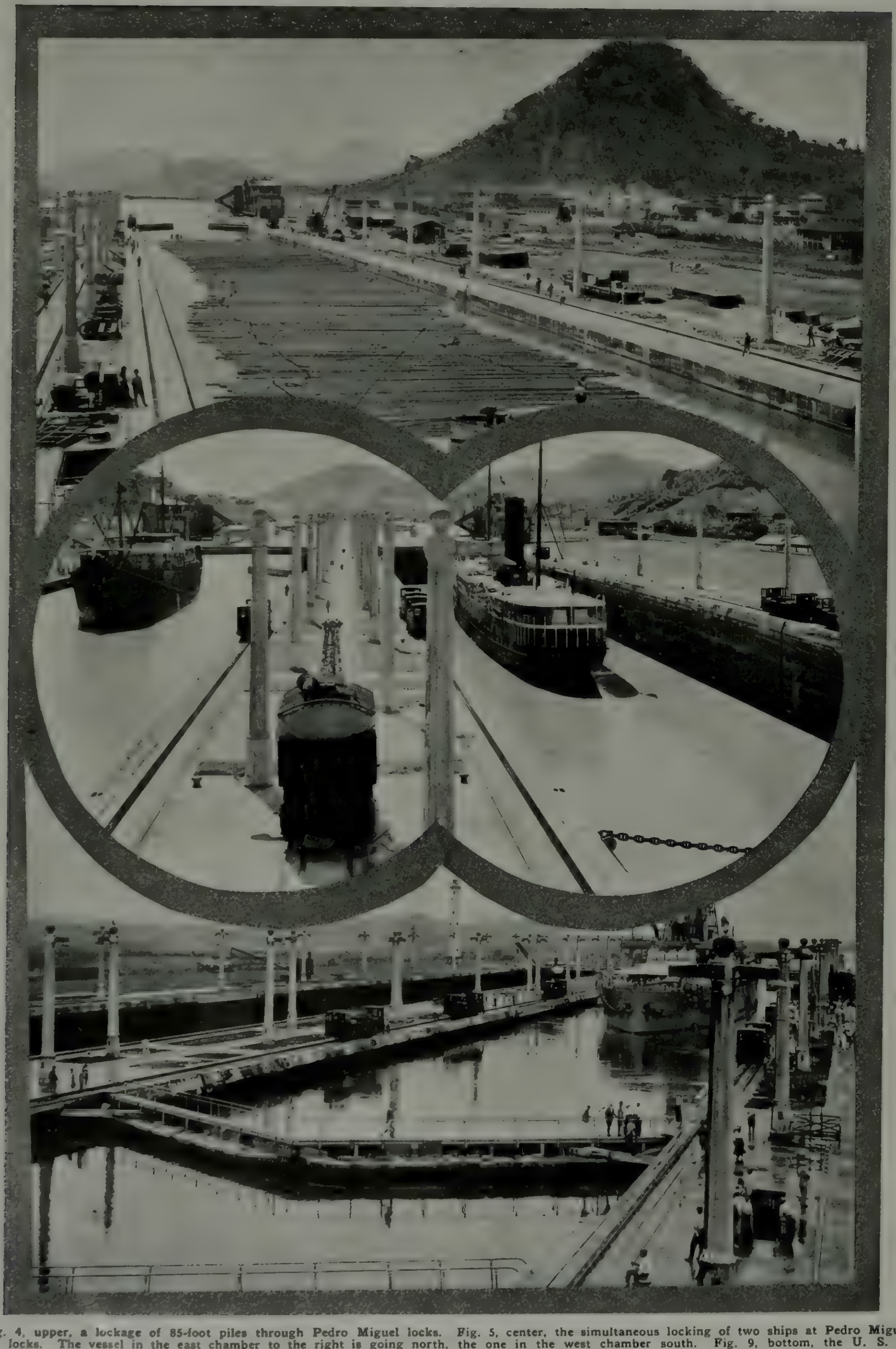


Fig. 4, upper, a lockage of 85-foot piles through Pedro Miguel locks. Fig. 5, center, the simultaneous locking of two ships at Pedro Miguel locks. The vessel in the east chamber to the right is going north, the one in the west chamber south. Fig. 9, bottom, the U. S. S. "Wisconsin" in the upper east chamber of Gatun locks.

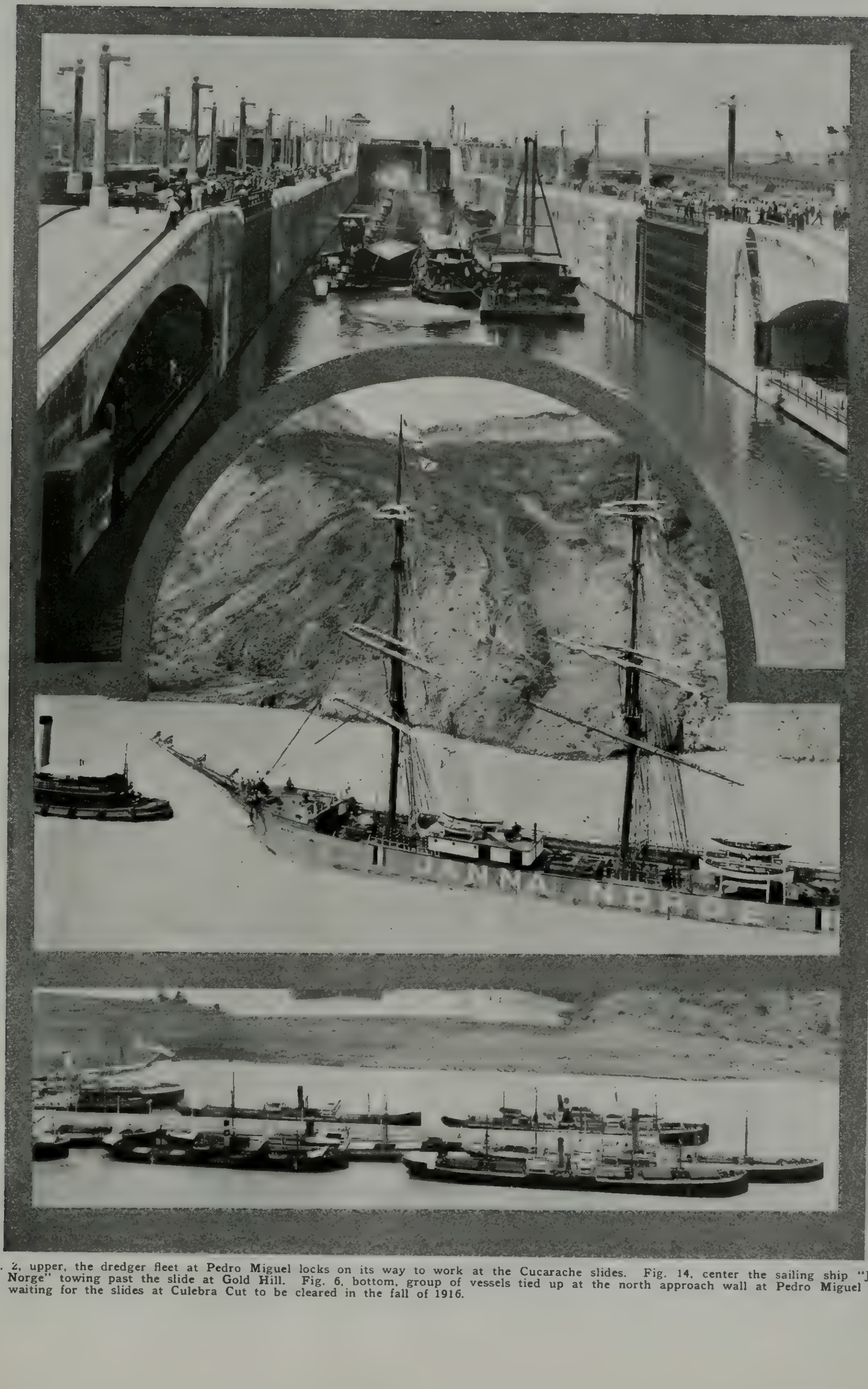


Fig. 2, upper, the dredger fleet at Pedro Miguel locks on its way to work at the Cucarache slides. Fig. 14, center the sailing ship "Janna Norge" towing past the slide at Gold Hill. Fig. 6, bottom, group of vessels tied up at the north approach wall at Pedro Miguel locks waiting for the slides at Culebra Cut to be cleared in the fall of 1916.

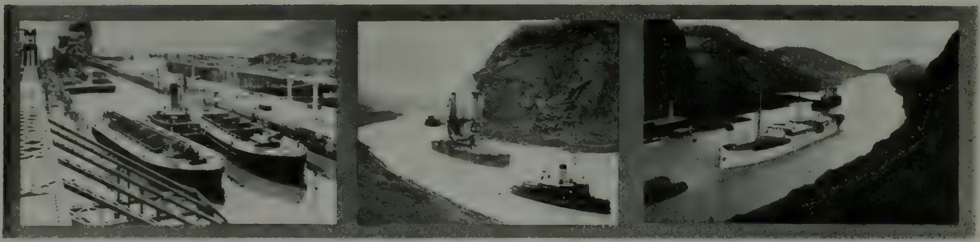


Fig. 3, left, the dredger fleet in one of the lower locks at Gatun. Fig. 8, center, the battleship "Ohio" passing Cucarache slide (this is the narrowest and most winding part of the canal). Fig. 13, right, the motorship "Jutlandia" passing through the canal in January 1915. The vessel is opposite Gold Hill.

A naval vessel of another type locked through the canal is shown in Figure 11. This vessel, the collier "Nereus," is here represented in the west chamber at Pedro Miguel locks. Six towing locomotives are attached to the collier, and the fender chains protecting the upper gates of the lock are all ready for lowering to permit the vessel to pass.

Following the slides in the canal in the fall of 1915, no vessels of any size were passed through the canal until the middle of March, 1916. Then the naval collier "Mars" arrived at Balboa from Chile with a cargo of nitrates for the government powder plant at Indian Head, and immediately afterward the "Prometheus" reached the same port with the "Maumee" in tow after fourteen days of steady steaming down the Pacific coast from San Francisco. The "Maumee" had been built at the Mare Island Navy Yard and was being towed around to the New York Navy Yard to receive her Diesel engines, which had been built by the New London Ship & Engine Company. Every exertion had been been put forth by the canal engineers to clear the watercourse sufficiently to allow the fleet of three special ships to pass through to the Atlantic entrance, and with dredges, barges and scows drawn up closely to the banks in the deep cuts where the slides had occurred, the collier, repairship and oil tanker made the journey to Colon through the locks and the canal proper without trouble and without delay of any kind.

Since the original opening of the canal, much has been heard of the numbers of Scandinavian and other ships operated by Diesel engines which have utilized the canal on their voyages to and from Pacific Coast points. Figure 13 is shown to illustrate a vessel of this kind, the "Jutlandia," passing through the canal in January, 1915. The photograph was taken looking south between Gold Hill and Contractor's Hill and shows the vessel directly opposite Cucarache Slide.

Still another interesting view is that in Figure 14, taken at the same point along the canal and showing the sailing ship "Janna Norge" towing past the slide.

The commercial and even the naval usages of the Panama Canal have not held as prominent a place in the public notice during the past year as their importance warrants. This is perhaps due to the veil that has been drawn over the movement of vessels and to the ever-increasing realization of the American people that their country is really at war and that sacrifices of all kinds have commenced to be required of them.

However, on the Pacific Coast, where the influences of the canal had just begun to be felt when the outbreak of war overturned all commercial life and threw it into new and untried channels, the quickening impulse that had touched international commence only to be shut off suddenly has not been forgotten, and when the German menace has been laid once and for all, this section of our commonwealth stands ready to benefit by the wonderful impulse which a return to the normal uses of this great waterway will create.

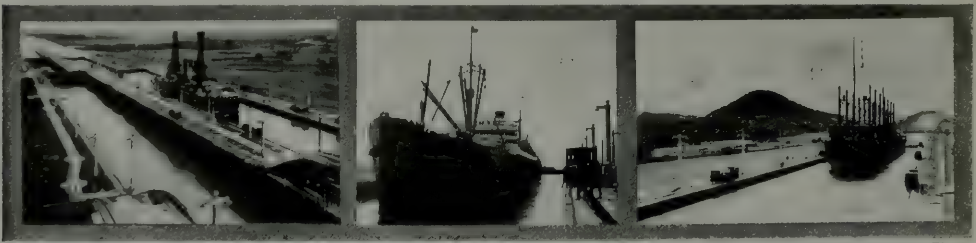


Fig. 7, left, the battleship "Ohio" in the middle east chamber of Gatun locks, on her way to the Pacific in the summer of 1915. Fig. 1, center, the first steamer to pass through the canal after it was opened to commercial use, the "Ancon," in the lower west chamber of Gatun locks. Fig. 11, right, the collier "Nereus" in the west chamber at Pedro Miguel locks.

An English View of America's Shipping

THE following article from the columns of Syren and Shipping Illustrated, of London, is of peculiar interest at this time as it deals with the problem which America has undertaken to help solve, namely, the making good of the wastage in ships and also of the problem this great American merchant fleet will present to the British shipbuilder and the British shipowner after the war:

"The civilized world—and, for the matter of that, the uncivilized world also, for Germany is interested in the matter—is watching with feverish interest the result of America's effort to supply tonnage to replace that which the Huns are so sedulously sending to the bottom. That we stand in need of such assistance is obvious, in spite of the optimistic observations of Mr. Lloyd George, who definitely states that the submarine menace is a rapidly diminishing one, and that out net losses have been less than they have been at any time since September, 1916. Just what he means by 'net losses,' we do not quite know, but we presume that he had in his mind the balance of tonnage sunk over tonnage built, a system of balancing which can hardly be counted as satisfactory or convincing. The output of new vessels may be all that was expected, but even on the Premier's showing it does not equal in volume the shipping which is being sunk. France, Italy, and neutral States are also losing ships, the former at a much greater rate than she or we can afford, and it is to America that France must now look to supply her wants. We do not think the national cause would suffer in the slightest degree from a little more frankness on the part of the responsible members of the Government. It would certainly help the food economy campaign if the public were informed in more detail as to the inroads made into our merchant fleets. What, for example, is the tonnage of the vessels sunk? We may be quite certain it is known to the Germans. How, too, is our shipbuilding programme progressing? Mr. Lloyd George has told us that our net losses are a quarter of a million tons per month, or three million tons a year, and against this we should turn out during the year close upon two million tons. Shall we do so? We may, but the signs are yet wanting that justify the hope that we will. Given a normal year and we have managed to put over two million tons upon the water, but an impartial survey of the situation will convince anyone that under present conditions the task is one of almost insuperable difficulty. In addition to the labor question there is that of material. It is impossible to bring ship plates into existence by a stroke of the pen, and it is impossible, also, to disguise the fact that the navy also demands something from our shipyards. Were straightforward candor more in evidence, we fear that the Premier would find it somewhat difficult to justify his hopeful predictions. Possibly he is quite right in thinking an optimistic people are more easily handled than if pessimism were more rife, but at the same time the plain truth is preferable to glowing pictures of what we would like to do but cannot. The same spirit of unthinking hopefulness pervades the average view toward the American shipbuilding programme. She is going to accomplish unheard-of things. She is credited with the power of turning out mine-sweepers and submarine chasers by the thousands, to say nothing of battleships, cruisers, and such small deer as torpedo-boat destroyers. And on top of all this she is to build a volume of merchant shipping equivalent to the output of more than three of our palmiest years. This is no haphazard statement, for it had its origin in the Government shipbuilding programme, which stated that, in little more than a year, the merchant fleet of the United States would aggregate 1600 vessels, totalling over nine million tons. It appears that 237 ships of 1,281,000 tons are under construction; 433 ships of 2,000,000 tons have been contracted for, and contracts for 452 ships of close upon 3,000,000 tons will be placed as soon as the requisite financial arrangements are completed. Then there are 150 other vessels of miscellaneous types totalling 1,800,000 tons and costing £60,000,000. The cost in respect of vessels to be requisitioned is put down as £103,000,000, while a sum almost equal to half that amount is to be devoted to the purchase of ships in being. We do not question for a single moment the financial strength of the great American Republic or the earnestness of her statesmen in making such a herculean effort to make good the shipping wastage of the war. We are, however, dubious, extremely dubious, as to the ability of the States to turn out anything approaching the volume of tonnage in the period mentioned. A little consideration will show that it is quite a physical impossibility to accomplish such an unprecedented output. We should think that two million or two and a half million tons is more like the volume of merchant tonnage that will be constructed during 1918. There can be little possible doubt that the popular opinion as to America's shipbuilding resources suggests that to some extent at least the wish is father to the thought. A capable engineer on the staff of a Government Department recently weighed up the pros and cons of the amount of assistance America may give the Allies in the matter of ships. He thinks that if in addition to the one and a half million tons of normal construction a further three million tons of carrying capacity can be launched in a year the United States will render all the help necessary. We are not too well informed on this side of the Atlantic, either, as to design of the American vessels of which it is hoped to launch 600 in record time. But the dead weight capacity we have mentioned will be all the more difficult of attainment if, as seems probable, the speed aimed at is 15 instead of 10 knots as was first suggested. In any case the 1½ to 2 million tons of frames, etc., and plates required will tax American resources very severely, especially as the demand for steel for other war work has vastly increased. The authority whose opinion we have quoted, points out that mining, both for coal and ore, steel makers, engine and boiler makers, and transportation companies are all essential factors in this shipbuilding programme. Plants will have to be increased, and this will make still further demands upon the steel industry, demands which he estimates at 50 per cent above the normal. Even this figure takes no cognizance of the fact that Japan looks to the United States for a big supply of shipbuilding material. Under these circumstances it is comforting to be assured by no less an authority than the Emergency Fleet Corporation, which is responsible to the Shipping Board, that there should be no insurmountable difficulty in securing the material, labor and equipment to enable the ten leading firms who undertook to build close upon 500 standardized ships in twelve months from carrying out their contracts. We hope they will; and also that the various bodies of experts—and they are legion—who are working to expedite the output, will pull together and work harmoniously for the common cause. Here is a great chance for American organization, for the United States is now confronted with as 'tall' a task as her industrial leaders have ever been called upon to tackle. We have a deep interest in the matter. We are not concerned in the question of the supply of tonnage to replace submarine wastage alone. It is impossible to ignore the new factor which the advent of America's fleet of merchantmen will introduce into the world's shipping business. What attitude will the Federal Government adopt with regard to her floating investments? Prior to the war the United States had one million tons of ocean-going tonnage. In 1918 or the following year she will, if her constructive schemes fulfil the optimistic estimates, have stepped into the place formerly occupied by Germany, with five million tons or thereabouts. Will this tonnage be nursed and fostered and subsidized by the State? If so the lot of the British shipowner will not become any rosier. He will certainly require more sympathy from his Government than he receives at present. However, that is a problem which must wait. What we are more immediately concerned with is the necessity of augmenting and expediting our shipbuilding output, as well to defeat the Germans as to be in a position as builders and owners to face the economic war which will come with peace."

THE CONCRETE SHIP

Herewith will be found pictures of work under way on the concrete ship of the San Francisco Shipbuilding Company at the concern's construction yard at Redwood City, California. This new type of craft is 320 feet by 45 feet by 31 feet depth in molded dimensions and will have a deadweight capacity of 5000 tons on 24 feet draft. Her oil tank storage will be sufficient for 30 days steaming at ten knots and she will be fitted with Scotch boilers and a triple expansion engine of 1750 horse power.

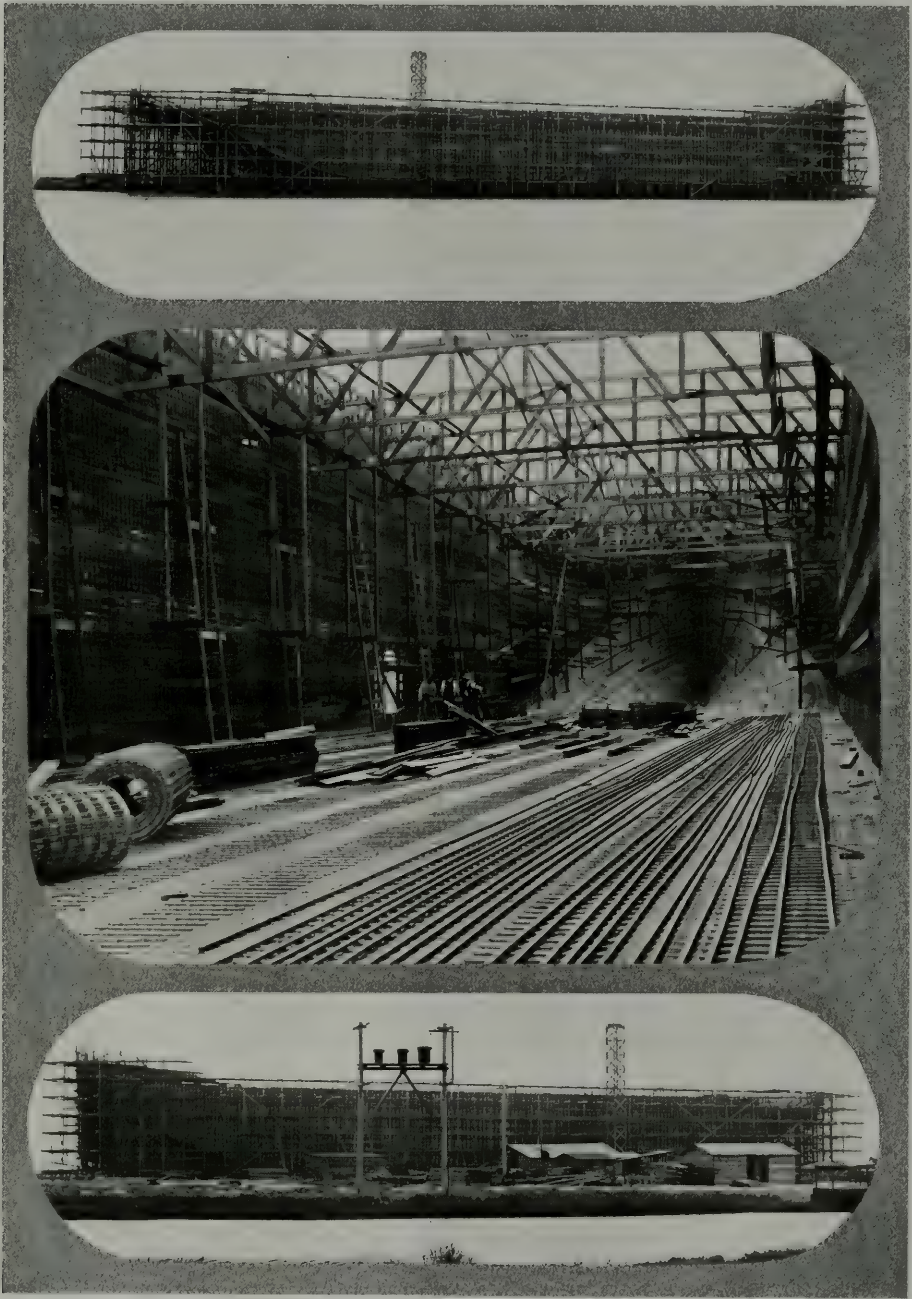
In looking at the picture the first thought that will strike the shipbuilder is the extreme simplicity of the plant required for this class of ship construction, the shipyard machinery required being almost negligible.

This vessel has aroused a great deal of interest in shipbuilding and shipowning circles primarily because of its radical nature and again on account of the people who are directly interested in the San Francisco Shipbuilding Company and the energetic manner in which they have gone about their work.

Of the stock in this concern which has taken up the problem of concrete ship construction, five-sixths of the issue is held by the following firms and individuals: Pacific Freighters Company; Balfour, Guthrie & Company; John H. Hooper; Santa Cruz Portland Cement Company; J. H. Baxter & Company; M. and H. Fleishacker Co.; Barneson-Hibberd Company; George U. Hind; Pacific Coast Steel Company; Oscar Sutro, Edward L. Eyre & Company; Comyn, Mackall & Company; M. F. Lowenstein; T. E. Pollock; Standard Oil Company; J. C. Zellerbach; Matson Navigation Company; W. H. Talbot; Geo. A. Moore & Company; Charles Sutro and Sidney L. Schwartz.

The officers of the concern: President, W. Leslie Comyn; vice-president, John Lawson of Balfour, Guthrie & Company; secretary, Kenneth MacDonald of MacDonald & Kahn, and treasurer, George U. Hind. Messrs. Leslie Comyn and John Lawson will act as an executive committee and exercise active management of the affairs of the company.

The fact that reciprocating engines are to be installed in the hull rather than turbines gives added proof that the management of the San Francisco Shipbuilding Company have every faith in the ability of the concrete hull to withstand not only the straining of the hull in a seaway but also to take care of the vibrations from machinery which will naturally be much more pronounced with reciprocating engines than they would be with turbines.



The starboard and port sides and an interior view of the concrete ship building by the San Francisco Shipbuilding Company at Redwood City, Cal. It is interesting to note the small amount of shipyard equipment employed in this construction. The center idea gives some indication of the amount of reinforcing employed. Details of the construction of the vessel are not available at this time.

Shipyard Wage Adjustments

THE United States Shipbuilding Labor Adjustment Board has fixed the following wage minimums for the shipyards of San Francisco, Portland and Seattle:

Machinists	$5.25
Machinist specialist	4.00
Machinist helpers	3.60
Molders	5.25
Pattern makers	6.50
Blacksmiths	5.25
Blacksmith's helpers	3.90
Anglesmiths	5.25
Heaters	4.50
Pipe fitters	5.25
Pipe fitter's helpers	3.60
Coppersmiths	6.00
Coppersmith's helpers	3.90
Firemen	3.60
Sheet metal workers	6.00
Sheet metal workers' helpers	3.60
Painters	5.00
Painters, bitumastic	6.00
Flange turners	6.00
Angle and frame setters	5.25
Pressmen	5.25
Boilermakers	5.25
Shipfitters	5.25
Riveters, shippers, caulkers	5.25
Acetylene welders	5.25
Plate hangers	5.00
Punch and shear men	4.50
Planermen	4.20
Countersinkers	4.20
Drillers and reamers	4.20
Holders on	4.20
Slab helpers	3.90
Plate hangers' helpers	3.90
Hook tenders	3.90
Flange fire helpers	3.90
Machine helpers, flange	3.90
Boilermakers' helpers	3.90
Shipfitters' helpers	3.60
Rivet heaters	3.15
Electrical workers	5.25
Electric workers' helpers	3.60
Molders' helpers	3.60
Foundry carpenters	4.50
Furnacemen	4.50
Casting cleaners	3.90
Laborers	3.25

Wooden Shipyards

Shipwrights, joiners, boatbuilders and millmen	6.00
Caulkers	6.50
Laborers and helpers	3.25

Among the agreements on working conditions for the San Francisco Bay district are the following: Eight hours shall constitute a day's work and shall be worked between 8 a. m. and 5 p. m., providing this does not interfere with the working shifts. There will be half holidays on Saturdays during June, July and August. Time and a half shall be paid for the first three hours overtime and double time thereafter. After February first, double time shall be paid for all overtime. Double time for Sundays and holidays. An additional five per cent shall be added to the scale for all men working on night shift.

Such grievances as do not relate to the subject of hours or wages covered by this agreement, which may arise in any shop, shall be given consideration as follows: Upon complaint being made by either party to this agreement in writing, the duly authorized representative of the firm and the business representative of the union, or the representative of the Iron Trades Council, who may be elected to represent the union, shall immediately proceed to the shop or shops where such grievance exists and endeavor to mutually settle the same.

Any grievance that cannot be settled by means provided herein shall be referred to conference, the call and subject for such conference to be made in writing. This conference shall be called within six days from receipt of notice for the purpose of adjusting the question at issue, and the conference shall continue day after day until the question at issue is settled, unless mutually postponed.

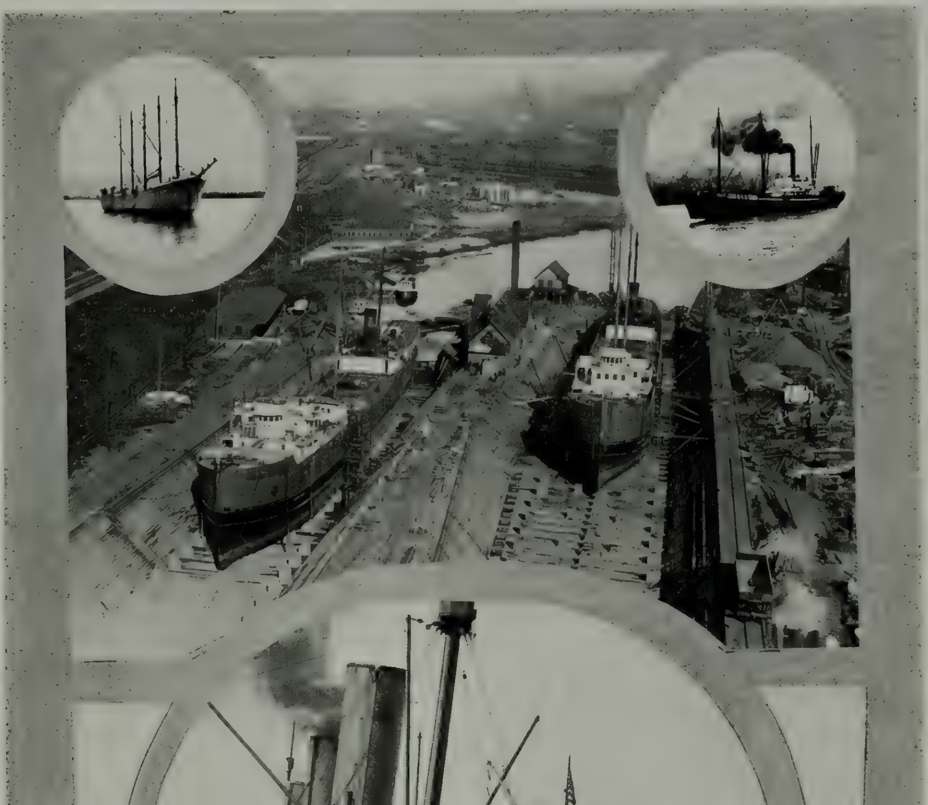
Any disputes which cannot be settled by means provided herein shall be referred to the examiner appointed by the Labor Adjustment Board as provided in the memorandum of August 20, 1917, and which is attached hereto and made a part of this agreement.

No change shall be made in existing conditions nor any new conditions established by any party to this agreement until the same has been agreed upon in conference. And these conditions shall always be construed so as to promote to the fullest extent the policy of the Government during the period of national need.

Employees shall be paid on some regular and definite day of each week and in no case shall more than a week's pay be held back.

During the life of this agreement there shall be no strike on the part of the employees nor lockout on the part of the employers.

Any employee laid off, discharged or quitting of his own volition shall receive all wages due him within 24 hours of the termination of his employment, excepting Sundays and holidays.



The upper picture is an interesting view of Great Lakes steamers in drydocks where they are being cut in two preparatory to passing through the Welland canal on their way to the ocean. The demand for steamers has led to a great many vessels too long for the canal locks to be treated in this manner. The lower picture is of the "Leviathan," formerly the "Vaterland," which was seized by the Government and converted to military uses. Photos by the International Film Service.

Thermostatic Metal to Control Devices

THE development of the G. E. Thermostatic Metal by the General Electric Company has put a new means for warning of undue heat or cold and prompt regulation of the temperature changes into the hands of naval architects, naval constructors and navigators.

This metal is so susceptible to temperature changes that a difference of one degree higher or lower will tend to curve or straighten it and always to the same extent. It can be used for temperatures as high as 500 degrees Fahr. By curvature or straightening it will make and break electrical contacts and even exert a force.

Its present use as a means of temperature regulation in furnaces and refrigerators together with its non-corrosive characteristics suggests its possibilities in marine service.

As a result of its responsiveness to change of temperature and the mechanical force developed, this metal is used to actuate various mechanisms which tend to neutralize either the temperature change or its effect upon devices.

G-E Thermostastic Metal consists of two strong non-corrosive metals possessing a wide difference in co-efficients of expansion, the widest difference possible for any known stable combination of metals. These two metals are firmly attached to each other throughout their entire length so that there is absolutely no slip of the one upon the other. Thermostatic metal can be cut, stamped or pressed into practically any shape, and when annealed will have all its original inherent qualities; morover, it will not deteriorate nor take permanent set under application of heat or force within definite practical limits. The metal is manufactured in various standard thicknesses ranging from 0.25 to 0.015 inches, maximum width of 6 inches and maximum length of 36 inches.

The deflection per degree temperature change besides being quite considerable as shown by the right-hand curve on photograph 382224, is a constant for any definite piece of the metal as will be seen by referring to the curve on photograph 382226. Since a definite and considerable opposing force is necessary to cause the metal to take permanent sets (See right-hand curve, photograph 382225), the metal can be depended upon when used in devices where extreme accuracy is required.

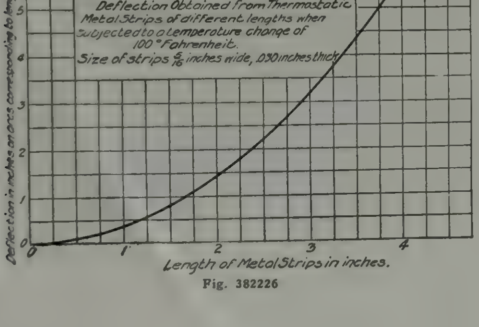


Fig. 382226

If the curving of thermostatic metal on heating or cooling is opposed, the metal will produce a mechanical force (See left-hand curve, photograph 382225), which is limited only by the force required to produce permanent set, right-hand curve, photograph 382225. For example, left-hand curve, photograph 382225, shows that a piece of thermostatic metal one-tenth of an inch thick, 5/16 inches wide, and 4 inches long will exert a force of 24 ounces (1½ lbs.) on being restrained from bending when subjected to a temperature change of 100 degrees Fahr. This curve illustrates the law that the force exerted by this metal varies as the square of the thickness, directly as the width and as the square of the temperature.

Other curves given illustrate the deflection resulting as one of the two dimensions, length or thickness, varies with a definite change in temperature. The width of the piece has no influence on the deflection resulting from temperature change. From these curves it will be found that the deflection for any given temperature change varies as the square of the length of the piece of thermostatic metal and inversely as the thickness of the pieces. As previously pointed out the deflection of any piece of metal varies directly as the temperature change.

G-E Thermostatic Metal is used in the products of many different industries owing to the fact that it can be successfully worked into different shapes and forms. In some of its applications it is used to actuate mechanisms directly by means of the force developed within itself when its tendency toward assuming a curved shape is restrained. In other applications it is used to close and open the contacts of electrical circuits by means of which various devices are operated.

Besides the previously mentioned possibilities in carburetor manufacture, for automatically controlling the richness of the mixture as the temperature changes, it could be used in scales, balances and other scientific instruments in compensating for errors due to temperature changes. It is used in furnaces, incubators and refrigerators for controlling the temperature.

The reliability of this metal has merited its use in thermometers and has gained consideration for it as a compensating device in watch balances,

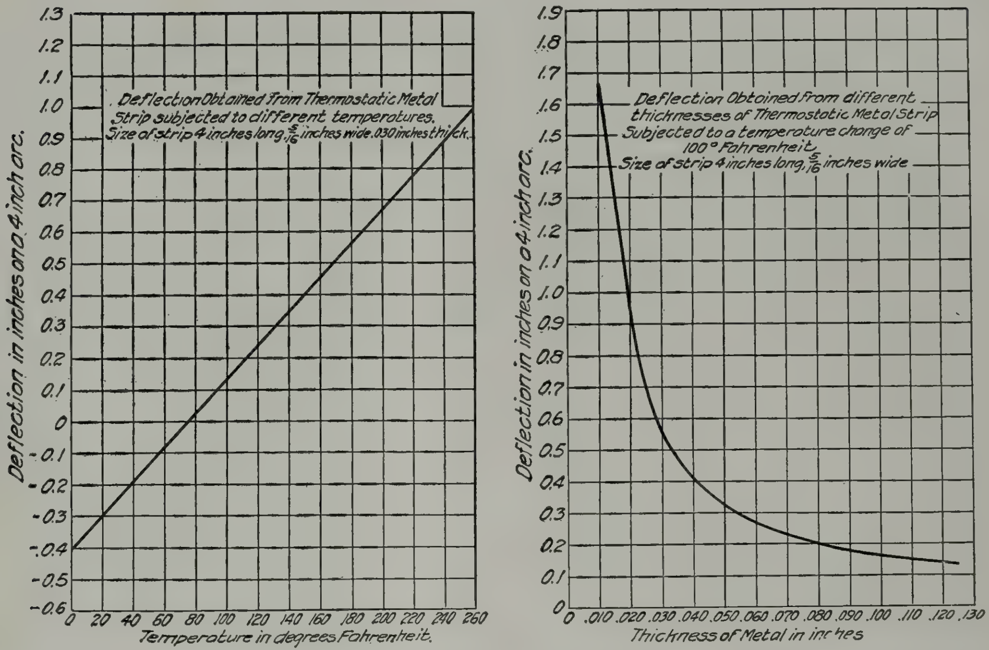


Fig. 382224

and it is but a step forward to see it used in the proverbially accurate ship's chronometer.

Thermostatic metal is a product of the Ft. Wayne, Ind., works of the General Electric Company where the desirability of a metal with its characteristics arose from necessities in the construction of certain types of electrical meters. This metal met the requirements so fully that manufacturers who had thermostatic and heat compensation problems adopted it as a matter of course.

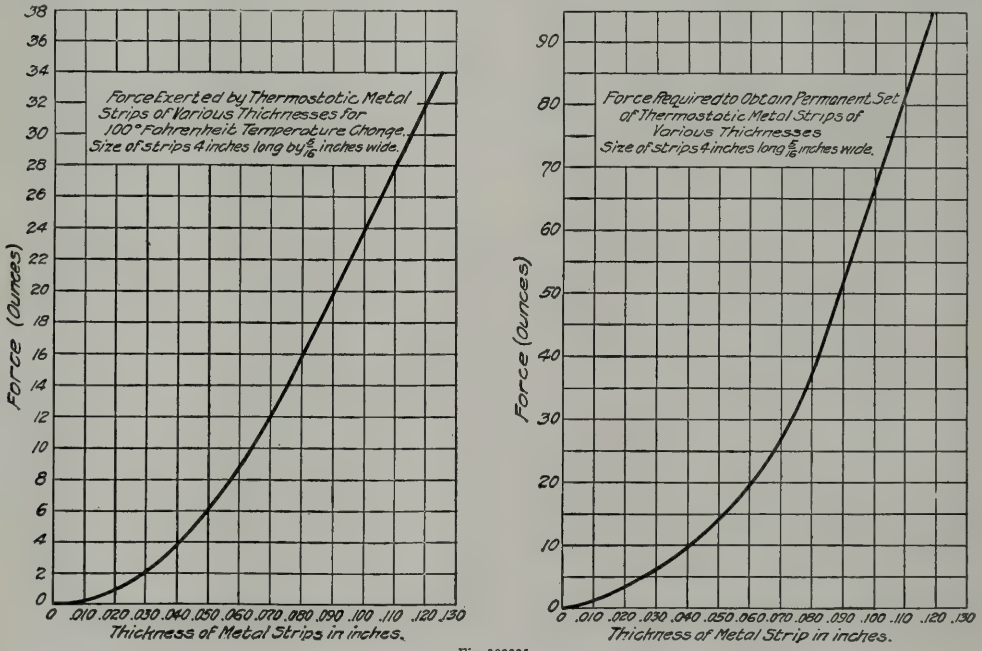


Fig 382225

Re-Organized Shipping Board as Viewed From Pacific Northwest

By W. D. B. Dodson

Executive Secretary of the Portland Chamber of Commerce

THE most optimistic views are entertained throughout the shipbuilding district of the Northwest as a result of the news from Washington that Chairman Hurley of the Shipping Board had been given authority and was exercising the same to get a more effective business organization in charge of that department in Government work.

The feeling prevails throughout the wood shipbuilding fraternity of the Northwest that the Government has not utilized its resources in as full measure as the crisis confronting the allied cause demands. Repeated presentations have been made at Washington to the effect that a vast increase could be accomplished in the wood shipbuilding program without retarding delivery of any contracts already placed by the Government. These presentations apparently have fallen upon deaf ears until Chairman Hurley took charge and the important step was announced the past week from his office that competent engineers with strong executive power and a disposition to get far-reaching and quick action would be named to direct the steel and the wood shipbuilding work.

The delays in getting vigorous action of a most important character in wood ship construction on the Pacific Coast are held here not to be chargeable to labor conditions, but mainly to the troubles and confusion that has confronted the Shipping Board itself. Changing policies discouraged builders who have contracts and who desired more. Companies desiring to form to take up other work gave up the plans upon receipt of positive statements from Washington that no more wood ships would be constructed. Then, when these prospective and existing builders tried to get foreign contracts and were turned down without reasonable excuse, further discouragement was given. As a whole the wood shipbuilding work has been held to be very much impeded and results that would have been possible under a well-informed and vigorous policy having been adopted at the very beginning, have not been realized. Also, in the matter of steel construction in Portland, work that could have been done if the private companies now building had been given proper encouragement, has not been accomplished. Two of the largest steel shipbuilding companies here were willing to lay down more ways and start construction on several more ships if the Government had given or guaranteed them contracts. The plants were available for this work, the labor was being secured as rapidly as needed, and very rapid progress could have been made in the steel program if the local companies had been properly protected.

When the vice-chairman of the first Shipping Board, Mr. Theo. Brent, reached the Columbia river, he outlined in definite form a policy that promised heavy construction as rapidly as it could be carried out. This program received the heartiest support by local interests and preparations were made to execute the same with the maximum patriotism of the community.

Before Mr. Brent and his chairman, Mr. Denman, could get the work launched a conflict arose between the Commission and the Emergency Fleet Corporation management. There was doubt in the minds of many people as to whether there would be any appreciable number of wood ships constructed. Capital of the strongest order that desired to enter the business was discouraged. Other capital that finally entered did so with more or less doubt and misgiving.

These difficulties were reduced by the time General Goethals became more familiar with the actual experience of the Pacific Coast in constructing wood ships of unseasoned Douglas fir, but by the time General Goethals had inaugurated a fair measure of work he was eliminated and a new regime took charge. This was hailed with considerable delight and high expectation. It soon developed that Admiral Capps was more repressive in the matter of giving encouragement to his work than his predecessor. Statements were quickly issued that no wood ships whatever beyond the existing Government program would be constructed. As requests were constantly being received by the local yards and proposed companies to build wooden ships on foreign allied government account, and also for private interests friendly to the allied cause, an appeal was made for permission to carry on this work. At first this was denied and then given false assurance of recognition. After a most vigorous fight and appeal for political pressure this policy was modified, but only after certain companies ready and willing to build had waited for months. More capital was driven from the prospect because of the interminable delays and the Government lost further opportunities to get much needed shipping.

As a rather unsatisfactory vindication of the claims that had been made in the Northwest of ability to build more ships, news was received the present week that the Douglas fir territory would have to furnish the larger materials to construct a number of yellow pine ships, for which contracts had been awarded to the South and Atlantic seaboard. It was then admitted that Southern pine people had been permitted to take contracts which they were wholly unable to carry out. Experts have declared that there are not two trees per acre in the best Southern pine forests that will yield the sizes of timbers required under the specifications for the yellow pine ship. Lumber companies failed to furnish the material and the shipse were not coming through on time.

Then the Shipping Board turned to the Douglas fir territory and is now appealing to our mills to furnish the material at much greater cost than if the same were used here to finish ships erroneously allotted the South.

Much greater building possibilities in the wood ship line than have yet been proven may be realized in the Northwest; material for some of the yellow pine ships may be supplied, all of the craft provided under the Government program may be constructed, and yet a large amount of other work can be undertaken. That the new regime of the Shipping Board, directed by competent business men, will in due time afford this opportunity is fully believed, with the result that many millions of dollars worth of wood construction will probably be soon placed in the Northwest in addition to that already contracted for.

The labor for such work may confidently be declared to exist here. There is not a wood shipbuilding plant in the Columbia district but what has a waiting list today. No effort has been made to draw from the interior in any appreciable quantity, although hundreds of applications have been filed to undertake this work. Four or five thousand more men could be drawn from nearby interior points and Portland if capital were given the privilege of organizing to conduct the work on a satisfactory basis.

NEW BRITISH SHIPYARDS

There has in the last month or two, says the September issue of "The Compendium," a British economic monthly, been a notable crop of new British shipbuilding projects, most of which are making progress toward realization. First, there is the new yard at High Pallion on the Wear, in which Sir John Ellerman and William Gray & Co. are interested—names which are sufficient guarantee of its practical success. The laying out of this yard is now in progress, and if expectations are fulfilled it should be ready for use next year. Then, on the Tees, Lord Furness, having disposed of his interest in the Irvine's Shipbuilding & Drydock Company at West Hartlepool, has in hand a big shipbuilding and engineering scheme, for which he has already acquired the land.

On the west coast an energetic attempt is being made to revive shipbuilding on the Mersey, which river, within memory, used to turn out fine vessels, but latterly has confined its operations to Birkenhead. The Mersey Shipbuilding Company has been formed and has secured the site of an old shipyard which is now being adapted to modern conditions. Further south, there is the projected yard at Cardiff, about which, however, nothing has been heard lately. At Chepstow the Standard Shipbuilding is now in full work, and is producing tonnage at a satisfactory rate, while at Newport an influential syndicate of London and Monmouthshire shipping men has made overtures for a wharf on the Usk, near the town, where some 20,000 square yards of land is available, and here it is proposed to lay down a yard for the building of standard ships.

Turning now to Scotland, we find several new projects already past the initial stage, apart from notable extensions which are in progress on the Clyde. At Dundee, the Caledon Shipbuilding & Engineering Company, which has recently made considerable extensions to their works, has now leased fifteen acres of land for laying out an entirely new yard to be specially adapted to the building of large vessels up to 15,000 tons deadweight in fact. The work in connection with this establishment will be taken in hand as soon as ever the war conditions permit. Dundee, too, will not improbably be the location chosen for the new shipyard of the Ferro-Concrete Ship Construction Company, Ltd., recently formed for the express purpose of building reinforced-concrete craft.

This company is in negotiation with the Harbor Commissioners for a suitable site with a river frontage of about 400 feet, and it is expected that the site will be procured before long. At first it is proposed to build comparatively small vessels, as in the circumstances is wise, since the concrete ship (other than barges) has yet to feel its way as an engine-driven seagoing vessel. Finally, at Leith, John Cran & Co. are understood to have secured a site for an additional yard in which to build ships of larger caliber.

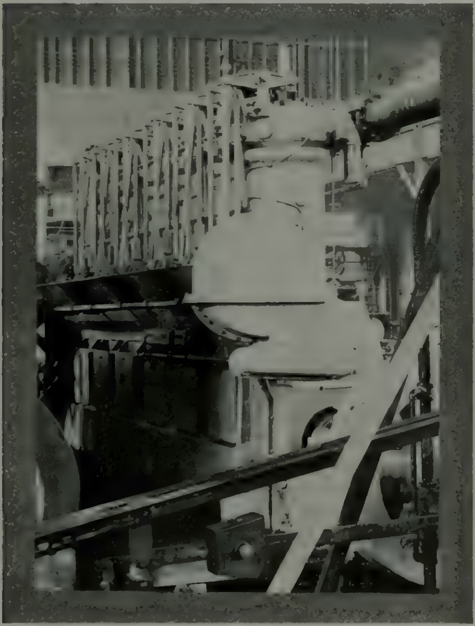
LAUNCH OF "CLAREMONT"

The steamer "Claremont" was launched from the Matthews shipyard at Hoquiam toward the end of October, and was the shipyards' sixth launch within twelve months. The "Claremont" is the latest addition to the Hart-Wood Lumber Company's fleet and is 240 feet in length, 43 feet beam, and 16 feet 6 inches depth of hold, and will transport 1,400,000 feet of lumber. She has no passenger accommodations. There is another steam schooner under construction at the same yard for the same owners that will be 290 feet long and have a gross tonnage of near 2500, probably the largest wooden steam schooner yet undertaken.

A New Marine Full Diesel Engine

THERE are now being shipped to the Pacific Coast a number of 500-h.p. heavy duty marine Diesel type oil engines, built by the McIntosh & Seymour Corporation of Auburn, N. Y.

The McIntosh & Seymour Corporation has enjoyed an unusual reputation as being the builders of the highest grade of machinery, for the past thirty-two years. They built vertical steam engines in all sizes up to 10,000 h. p., and a great many of this country's most prominent installations of this character of equipment was made by them. They have associated with them, today, a corps of engineers whose experience in the Diesel engine field extends over a period of sixteen to seventeen years and are, therefore, unusually equipped to meet the country's demands for high-grade Diesel engine equipment for marine service, as well as stationary.



The new McIntosh & Seymour 500-horsepower marine unit.

The engine is substantially built along standard lines and the shop tests on the engines have been most satisfactory in every way, bringing forth very favorable comment from all the marine engineers who have seen them in operation.

The engine has six cylinders and is of the four cycle type, single acting and is directly reversible. The general arrangement of the engine is well shown in the various illustrations, and as can be seen the framing of these smaller sized units is of the box type, provision having been made for convenient access to all the working parts. The form of framing is such as to give the greatest stiffness with minimum weight, and reduces the size of the base, at the same time decreasing the weight of the engine.

The air for atomizing the fuel for the working cylinders, also that required for maneuvering is furnished by a three-stage compressor, located at the forward end of the engine and directly driven from the engine. In cases where the engines are used for twin screw vessels this compressor is of ample size to supply atomizing and maneuvering air for both engines in case of necessity. It is substantially built with inter-coolers and after-coolers arranged according to the most modern practice. The valves and cages are all accessible and removable as a unit, making their removal or renewal a simple operation.

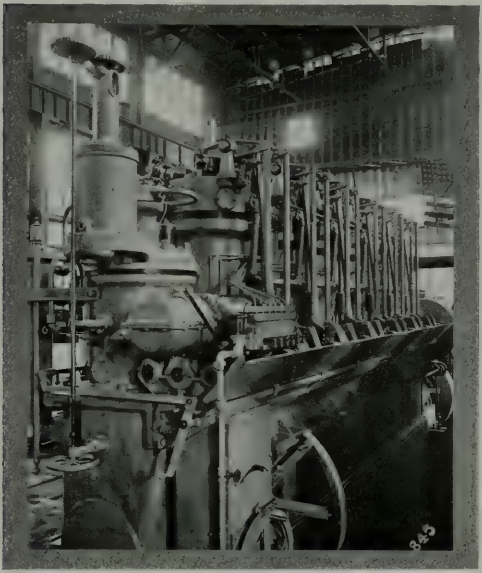
Both the Standard Horseshoe Marine Thrust Bearing and the "Kingsbury" Thrust Bearing are used by this corporation, for their marine engines. The thrust bearing is carried in a substantial base, bolted securely and doweled to the engine base, and contains a large bearing located at its after end, making it possible to carry the fly wheel overhung, as indicated in the illustrations. The main working cylinders are bolted to the top of the engine frame and are of a simple design provided with removable liners. The heads are separate from the cylinder each containing an inlet exhaust, fuel and starting valve. The gear for operating these valves is clearly shown in the illustrations.

The cam shaft, as can readily be seen, is carried in a housing bolted to the engine framing, and driven by spur gears from the after end of the crank shaft. From the forward end of the cam shaft a fuel pump and speed limiting governor is driven.

The maneuvering gear which can easily be understood from a careful study of the illustrations, is located at the forward end of the engine. The maneuvering which is accomplished by simple operations, is all done in the proper sequence, due to the interlocking features of this device, thereby preventing the operator from damaging this equipment, in any way, due to the misunderstanding of its functions. The supply of fuel and the consequent control of the ship's speed is accomplished by one single lever.

There is arranged a control lever, within easy reach of the operator, which is devised to relieve the cylinders of any pressure and when brought into operation, automatically shuts off the atomizing air when these relief valves are open.

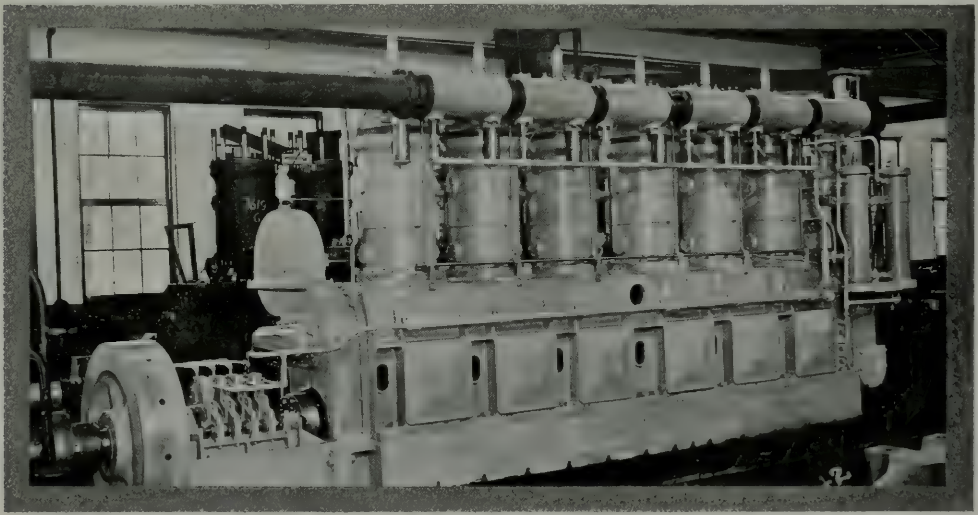
The lubrication for the working cylinders, piston pins and compressor is effected by the use of a Richardson Phenix Force Feed Lubricator, driven by gears and suitably timed, so that the lubricating oil is delivered to the various parts during that portion of the cycle that is most beneficial. The oil for the crank pins, main bearings and other journals is supplied from a gravity system, through gang oilers conveniently located. As the engine is entirely enclosed, the base having a bottom cast in, the oil is all collected in the base, and is returned through a filter to the bearings by gravity. A small pump driven from the cam shaft is arranged for automatically handling this oil.


View showing the operating gear for the valves.

The principal features of this engine are: The thorough preparation of the fuel, which has proven to be very effective both on the marine and stationary engines, built by the McIntosh & Seymour Corporation. The thorough cooling of the upper part of the liner and cylinder head is also a point not to be overlooked in the selection of an engine for continuous marine service. The cooling system on this engine is so arranged that salt water can be used for cooling purposes without coming in contact with steel studs or any parts liable to be affected by it. It has the same effective cooling however as on stationary engines and the same even flow and proper circulation through the head.

In the shop tests of these engines, they are subjected to a continuous run, such as would be the equivalent of a normal ocean voyage, during which period numerous maneuvering trials are made. The average time consumed from the full speed ahead to full speed astern for fifty maneuvers is eight seconds. Very likely this time could be reduced, when the engine has become thoroughly limbered up and the operators are perfectly skilled in the handling of same. The fuel consumption of this engine is a trifle over .4 of fuel oil per B.H.P. hour, when operated at rated speed and rated load. It has been demonstrated that these engines are capable of a reduction in speed of 60 per cent.

The McIntosh & Seymour Corporation have been extremely liberal in the selection of all the accessories and equipment that they furnish with


The McIntosh & Seymour 500-horsepower marine unit in the shops of its builders. This engine has been put through exhaustive tests in order to secure, if possible, any refinements in design suggested by the results obtained.

these engines, and one evidence of this fact is that the maneuvering tanks furnished with the engines, in which they carry 300 lbs., are of sufficient size to start these engines forty-four times, the minimum starting pressure being 80 lbs. The average reduction in pressure in this maneuvering tank, per start, being 5 lbs. for each maneuver.

The standard sizes built by this corporation are: 300 B.H.P., 500 B.H.P., 750 B.H.P. and 1350 B.H.P.

THE "WAR FLAME"

On November 1st the Skinner & Eddy Corporation shipyard at Seattle launched the freighter "War Flame," a vessel of the standard 8800 tons' deadweight type being built at this plant. The "War Flame," which was ordered by the Cunard Steamship Company through Esplen & Sons of New York, was on the ways only sixty-four working days certainly a splendid construction record.

On November 24th the same first launched the first of the 8600-ton freighters ordered by the Emergency Fleet Corporation, this vessel having occupied a set of building-ways for seventy-six working days, and on November 28th occurred the launch of the "Trontolite," a large tanker originally ordered by the Standard Oil Company, but now, of course, commandeered by the Emergency Fleet Corporation. This will give the Skinner & Eddy yard a record of nearly 30,000 deadweight tons of shipping launched during November, and with two more launchings scheduled before the first of the year, will make eleven vessels put in the water of about a total of 100,000 tons' deadweight for 1917.

SHIPBUILDING IN AUSTRALIA

In view of the efforts which are being made by the Australian government to develop the shipbuilding resources of the commonwealth, it is recalled that many years ago, when the "windjammer" was still an important factor in the world's marine, the yards of New South Wales and Tasmania turned out vessels of no small repute, and even in Western Australia wooden ships of a respectable tonnage have been launched. But shipbuilding, with the advent of the steel vessels, languished in Australia. The tonnage constructed in the past four decades has been trifling in comparison with the tonnage brought on the Australian registry. And the class of ships built has been very small. In the years 1876-1915, inclusive, there were built in New South Wales:

	No.	Tons.
Sailing vessels	652	30,555
Steam vessels	689	48,217
Motor vessels	24	364
Total	1365	79,136

The figures strikingly indicate the insignificance of the type of vessels built. These figures, which are taken from the New South Wales Statistical Register, can scarcely include the construction work done in recent years for the Commonwealth Government. The State of Victoria has not made nearly the progress of its neighbor in shipbuilding.

Launch of the freighter "War Flame" at the yards of the Skinner & Eddy Corporation, Seattle.

Some four years ago the Victorian government spent £100,000 in establishing shipbuilding yards at Williamstown, and the story since might make an interesting chapter in the annals of shipbuilding. The yards have been maladministered and neglected by the government, and what under efficient administration might have been a valuable addition to Victorian industry have been, to the present, nothing but a huge drain upon the taxpayers.

Something has leaked out, but not all, concerning the methods of the Commonwealth Government at Cockatoo Island, says "Shipping," New York. When the complete story of the cruiser "Brisbane" is published—if it is ever published—after the war, it is believed it will provide some startling illustrations of how not to do it, and of how public money can be wasted by government departments. With such facts as are available, and those which are suspected, it must be admitted that a shipbuilding program under government auspices in Australia is one which will not be lightly subscribed to. There are not in Australia 100,000 men to spare for ship construction; but in New South Wales and Victorian yards there are more than 5000 employees, and in the remaining states are many whose trades may be adapted to shipbuilding. These numbers might perhaps be expanded to 20,000 in the Commonwealth, and the construction of ships, instead of being a dream of the distant future, become a vital fact of the present moment.

The Progress of the Screw Propeller

By Raymond E. Lovekin

Managing Director, American Screw Propeller Co.

EVER since the early days when the naked hand of man was used as a paddle for the purpose of propelling a raft or dugout, there have been numerous experiments made in connection with securing the most efficient means to impart motion to a vessel. Probably the first rotary motion applied for this purpose was in the year 1472, or thereabouts, when numerous paddle wheels were fitted along each side of a ship and rotated by man power from cranks arranged along the center line of the vessels.

Numerous other experiments were made by inventors during the fifteenth and sixteenth centuries in connection with various types and shapes of paddle wheels, also with hydraulic propulsion, although experiments with the latter never proved of any real value. In 1793 a paddle boat operated by a steam-engine was actually run from Manchester to Runcorn, but the slight speed obtained resulted in the abandonment of this vessei for the time being, and it was not until nine years later that a stern-wheel paddle boat actuated by a steam-engine was successfully run in England.

In 1807, Robert Fulton, of New York, produced the "Clermont," which was a side-wheeler operated by a steam-engine. This craft proved quite successful, and her performance led Mr. Fulton to build several more quite efficient ships of practically the same type.

From 1807 to 1875 many more or less successful attempts were made to utilize the screw propeller as a means of propulsion, special credit during this period being given to the following gentlemen for their theoretical and practical work along this line: William Church, John Millington, Jacob Perkins, Bennet Woodcroft, Samuel Brown, John Ericsson, Joseph Maudelay, Robert Griffiths, Sir John Thornycroft and Mr. Yarrow.

The development of the screw propeller from 1875 to the present time has been marvelous, and today practically all self-propelled vessels, excepting some ferryboats and river and lake steamers, are put in motion by means of screw propellers. This fact is due to the numerous experiments made upon the resistance of hulls and the adoption of model tank tests, also through investigations into the elements of screw propellers and their design. Probably the most credit during this period is due to the following gentlemen, whose untiring efforts and remarkable foresight have resulted in their being recognized the world over as experts: Professor Rankine, Mr. Sidney Barnaby, Mr. A. E. Seaton, Mr. Peabody, Mr. R. E. Froude, Rear-Admiral David W. Taylor and Captain C. W. Dyson. The latter two gentlemen, of whom the United States may well be proud, are unmistakably recognized as the most modern authorities today on the subject. Admiral Taylor's fame rests on his work in connection with the resistances of hulls and investigation of propulsive problems, and Captain Dyson's on his work in connection with the estimation of power for the propulsion of vessels and the standard method of propeller designing which he has evolved.

For operation in the routes to Mercer Island and East Lake, Washington points, the Port Commission is now completing a 65 foot 100 passenger ferry launch, the "Dr. Martin," named in honor of Dr. Martin, a pioneer resident of Bellevue, on the shores of East Lake Washington. The vessel was launched recently at the Queen City Boatbuilding Company's plant. She will be powered with a 120 horsepower Van Berk engine giving her a speed of fourteen knots.

Infusing New Blood at Washington

THE recent announcement that Henry Ford is to take an active interest in the shipbuilding programme of the United States will probably be looked upon with great satisfaction by the layman, but with some skepticism by the shipbuilder. It is stated that Mr. Ford's unquestioned ability for organization as it affects a fixed and standard product will now be centered upon the manufacture of parts for marine engines. That means standardized engines for standardized ships. If this be the case, we wish the engine-builders much better luck with the standardization problem than has been the lot of the shipbiulder.

Whatever advantage may be claimed for the standardized ship will never materialize as long as the administration of the affairs of the construction end of the United States Shipping Board is kept passing from one set of hands to another. The standardized ship has refused to stay standardized for any length of time, and every change at the fountain head at Washington necessarily means a change in what is acceptable in the standardized ship.

Looking at the matter from the standpoint of tonnage production—and it seems to us that this is the proper standpoint to view the matter from at this time—it would appear that the greatest number of ships could be procured by allowing each shipyard to go ahead producing the type of freighter which it has been building for the past year or so.

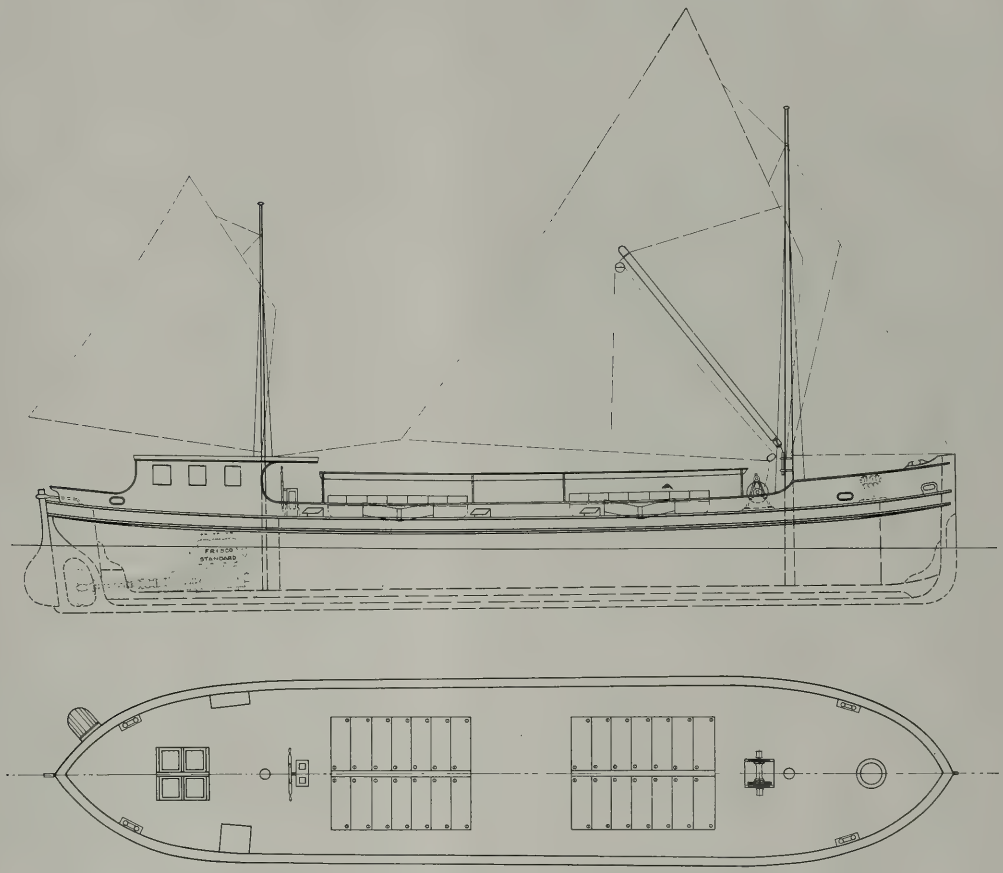
The real shipbuilder will never look with favor upon the standardized ship. It means the deterioration of shipbuilding into ship manufacturing. Shipbuilding is an art. Ship manufacturing is not. When a vessel's specifications become say standdard hull number seven, standard propulsion equipment number thirteen, standard windlass 4-A standard winches number seventeen, standard rigging lay out number three, etc., then the shipbuilding will have become a dead thing. A complex mechanical art which offers more opportunity for initiative than any other constructive work of today will become an uninteresting and wearisome mechanical labor. It is highly doubtful if any material advantage to be derived from the completely standardized ship will offset the loss that occurs when the shipyard ceases to be a school and becomes merely a work shop in the poorest sense of the words.

In the matter of standardizing equipment there is always the danger of running into over equipment. This is a thing which has often made itself strongly felt in our Navy. Those who are responsible for choosing the items of standard equipment are continually changing and the equipment will not only change with them, but it will multiply until the original saving in cost will be wiped out altogether and a heavy increase substituted.

Again in the matter of equipment, if an article prove itself to be unfitted or uneconomical it has not done so through use on a few ships but through adoption on hundreds of vessels, thus making its removal and replacement an exceedingly costly item.

The Emergency Fleet Corporation has decided that each of the freighters it is building as well as each of the steamers which it commandeers while under course of construction will be fitted with two 30-ton booms with the necessary heavy gear to go with them. Now presumably the reason for this is that very few American ports are fitted with heavy floating cranes and these booms are therefore necessary for the handling of heavy weights such as guns and weighty equipment of all kinds.

These booms with their gear weigh about thirteen tons, so that each and every one of these ships will be transporting thirteen tons of unnecessary top hamper back and forth every trip. If each of the six hundred ships on the Shipping Board's program make twelve round trips to Europe each year these two heavy-cargo booms mean a loss in carrying capacity on out-bound voyages only of close to 100,000 tons of freight. But are not these booms strictly necessary? Certainly not. The money which it will cost to make and install them and their tackle would outfit every port of any importance along the shores of the United States with a floating crane of thirty tons capacity or larger. Now some change in the powers that be might decree that these thirty-ton booms were unnecessary and that they should be replaced by a medium tackle of twenty tons capacity or that they were not heavy enough and must be replaced by fifty ton tackles. This is an example of what may be expected in standardization of ships and their equipment under the form of government which obtains in the United States where frequent changes in the directing heads of government and semi-governmental bodies are bound to occur. As long as the old adage "many men, many minds" holds true the standards set up for the standard ship and her standard machinery will continue to change and there is nothing in this world more costly to change than a standard.



Businesslike lighter now being used in Singapore harbor. She is powered with a "Frisco" Standard Gas Engine.

NEW TYPE LIGHTER AT SINGAPORE

The plans published herewith are illustrative of a new type of motor lighter in use in Singapore on the Malay Peninsula. The boat shown in the plan is being built by Graham Hutchison of Singapore for Hooglan & Company, who maintain a large lighterage business at that port. This concern, like others in the vicinity, formerly had their barges towed by small steam tugs or manned by sweeps in the hands of a native crew. The dimensions of the new tug are 95 feet over all, 94 feet on the water line, 19 feet 4 inches beam, 6 feet 6 inches load draft and 3 feet 9 inches in light trim.

This handsome, business-like, teak lighter will be powered with an 80 horse power TC Standard marine engine with cylinders 9⅜ inch bore by 12 inch stroke and turning a 48 inch propeller. The engine will be equipped with the new Standard attachment for burning kerosene and the fuel consumption will be one-tenth of a gallon per horse power hour, or ten brake horse power hours on one gallon of fuel. The remarkable record of the Standard for reliability, power and general absence of trouble of any sort is strikingly attested in the present instance. The home office of Hooglan & Company is in London where, despite the war, there is a great deal of engine manufacturing going on and where strong pressure was brought to bear upon Hooklan & Company to purchase an English engine. However, the staunch qualities of the Frisco Standard managed to beat down all opposition to purchasing a western engine.

This is the first engine of its size to go to the Malay Peninsula from the Pacific Coast and since receiving the order the Standard has been deluged with inquiries concerning units of like qualities and power. The purchase of the engine was made through Mr. Toplitz of the well known firm of MacDonnel & Company.

Wage Adjustment Board's Report

IT is believed in Portland that the wage schedule furnished by the Wage Adjustment Board, which recently made its final report in San Francisco, will be accepted by all patriotic laborers in the Columbia river district. There were some disappointments when the schedule was announced for both employer and employee. Employers feel yet that there is no warrant for making the Pacific Coast wage schedule appreciably higher than that prevailing on the Atlantic seaboard. Living conditions here are declared better and cheaper than in the great industrial centers of the East. Rentals in Portland today for good houses are probably the cheapest of any place in the United States. Immense quantities of food products are taken from the soil at nearby points and those of a perishable character naturally sell at reasonably low figures during the season. This is also the great bread producing center of the Pacific Northwest; the livestock center, an important fruit center for packing, and the cheapest furniture center in the West, if not in the United States. Practically everything that the laborer needs for his home requirements is found here at a low figure and the employers resent the idea that this community should be kept on some stilted wage scale, due to an alleged Western high cost of living that does not exist.

On the part of the employees, they hold that some of the schedules are inadequate. This does not apply to the wood-working plants so much as to the steel, but in both confidence has been expressed by the leaders, who appreciate the national needs of the day, that the laborers will go ahead pursuant to an appeal of the administration and the national leaders in the labor class and give the wage schedule a fair trial for the next few months.

After a trial of six months another adjustment may be asked if the present one is found unsatisfactory. The belief has been expressed in business circles that, if America is to have any power in executing her part in the great struggle, that such adjustments of wage problems as was undertaken by the Wage Adjustment Commission recently on the Pacific Coast must be accepted, and all interests must join in producing the ships needed by the Government or else the democracy of America will prove a negligible factor in the final results now in the balance on Europe's battlefields.

LAUNCH OF THE "CHESTER SUN"

On October 30th there was launched from the yards of the Chester Shipbuilding Company the 10,000-ton bulk oil carrier "Chester Sun." This vessel has been built to the order of the Sun Company of Philadelphia and is of the following dimensions: Length over all 445 feet; length between perpendiculars 430 feet; beam moulded 59 feet, depth moulded 33 feet 3 inches; gross register 6583 tons; indicated horse power 2500.

The vessel is designed to carry 10,300 tons on a draft of 25 feet 6 inches and for a speed of 10½ knots in service. She has been built under special survey to obtain Lloyd's highest class and is constructed on the Isherwood system.

The "Chester Sun" is of the "three island" type, having complete main and upper decks, expansion trunk and poop, bridge and forecastle decks of steel. Accommodation for the officers is provided in a large deck house on the bridge deck. The engineers are berthed in deck houses alongside the engine and boiler room casings on the poop deck and the crew is accommodated in the poop on the upper deck abreast of the machinery spaces. Extra accommodation has been provided on the bridge deck amidships for a gun crew. The accommodations are up-to-date in every respect, being spacious and well appointed.

The propelling machinery of the "Chester Sun" is fitted aft and the fuel oil is carried in deep tanks. The main cargo space has been divided into nine tanks on each side and with the usual Summer tanks these give a total cargo oil capacity of 3,300,000 gallons. The total capacity of the fuel oil tanks is 380,000 gallons. The power plant consists of three single ended Scotch boilers 15 feet 3 inches in diameter by 11 feet 5 inches long, carrying a working pressure of 190 pounds and furnishing steam to one triple expansion engine having cylinders 27, 45½ and 76 inches in diameter by 51 inches stroke. The usual auxiliaries for this type of vessel are fitted in connection with the main engines. The cargo pumping outfit consists of two large cargo oil pumps, the pump room being located amidships and the pipe arrangement providing for the emptying of separate tanks or the transferring of oil from any one tank to any other.

The deck machinery consists of three large warping winches, steam windlass and steam steering gear. The usual armament for defensive purposes against submarine attack has been provided for. The vessel has been requisitioned by the Emergency Fleet Corporation and will prove a valuable addition to the mercantile marine of the United States.

As the "Chester Sun" was leaving the ways she was gracefully christened by Mrs. J. Howard Pew, whose husband is President of the Sun Company for whom the vessel was built and also President of the Sun Shipbuilding Company.

KOBE'S FOREIGN COMMERCE

The foreign commerce of the port of Kobe has shown a remarkable expansion since the outbreak of the war, writes Consul Robert Frazer, Jr., Kobe, Japan. In 1916 its total foreign commerce increased 36 per cent as compared with the year immediately preceding the war, or from $258,539,000 to $352,601,000; and, although the latter amount constituted a record when it was made, it bids fair to be surpassed by about 35 per cent in 1917.

The United States is both the chief customer of and principal seller to this district, the total volume of trade betwen the United States (including insular possessions) and Kobe having amounted to $81,000,000 in 1916. Of this large sum, more than $50,000,000 represented Japanese purchases from and $30,000,000 Japanese sales to the United States.

Returns of the foreign trade of Kobe, as compared with the most recent returns available for the other principal ports of the Pacific, are as follows:

Kobe, Japan, 1916	$352,601,000
Yokohama, Japan, 1916	353,645,000
Shanghai, China, 1916	348,689,000
Singapore, Straits Settlements, 1915 (inclusive of intercolonial trade)	273,211,000
Sydney, Australia, 1915	257,097,000
San Francisco customs district, 1916	209,138,000
State of Washington customs district, 1916	300,541,000
Manila, 1916	87,248,000
Valparaiso, Chile, 1915	38,234,450
Canton, China, 1916	67,103,963
Tientsin, China, 1916	52,534,000
Callao, Peru, 1915	29,438,000

Complete returns of the foreign trade of Hongking, the only first-rank port on the Pacific not included in the foregoing list, are not officially kept, but it is not believed that the commerce of that port approaches Kobe's. Export from Hongkong to the United States and its insular possessions in 1916, which constituted a record, amounted to $13,872,000.

While it is true that in 1916 Yokohama outranked Kobe, for the first seven months of 1917 the foreign trade of that port amounted to only $237,922,000, contrasted with Kobe's seven months' total of $270,479,000. Pro rated for the complete year, this indicates a total of $463,678,000 in 1917 for Kobe, against $407,866,000 for Yokohama. American figures for the fiscal year 1917 (ended June 30) show the total foreign trade of the Washington customs district to have been $376,000,000, and that of the San Francisco district, $286,840,000.

A wooden launching at Wilmington, North Carolina.

RECENT FRENCH SHIPPING LEGISLATION

A French measure dealing with bills of lading, presented in the name of the President of the Republic by the Minister of Public Works and Transports and the Minister of Commerce and Industry, of which I have received a copy, contains provisions on the lines of the American Harter Act and of somewhat similar legislation adopted in Canada, Australia and New Zealand. A translation of the first clause of the French bill is as follows:

"Any clause in a bill of lading or in any other document relating to the sea carriage of goods purporting, directly or indirectly, to relieve the shipowner from his liability according to common law, to shift the burden of evidence, to derogate from Article 229 of the Commercial Code or from the legislation on stowage or to confer jurisdiction on a foreign tribunal shall be null and void and of no effect. The shipowner however, shall be at liberty to free himself of responsibility for the nautical negligence of the master, pilot and crew."

In the report of the Dominion's Royal Commission, issued in the spring, legislation was proposed on the lines of the Harter Act of 1893, which, while prohibiting shipowners from contracting themselves out of various liabilities in bills of lading, at the same time restricted their liabilities in certain clearly specified directions. Even more important, however, than the French adoption of such legislation seems to be the decision to deny to owners the right to confer jurisdiction on a foreign tribunal. The effect of this would be that many cases of the types which, with the full agreement of all parties, have in the past been heard in British or other courts could in future be dealt with only in the French courts.

Around Puget Sound

IMPROVEMENTS and enlargements of the Skinner & Eddy Plant has progressed to the stage where anyone traveling up or down the East Waterway can gain some idea of the immense size this yard will attain on completion of the work.

Several months ago the company obtained all of the land north of its plant to the south line of the Seattle Construction and Dry Dock Company's plant. This gives the Skinner & Eddy Corporation all of the land bounded by Massachusetts street on the south, Connecticut street on the north, and from Railroad avenue to the East Waterway, making the total ground area twenty-seven acres. The added portion was previously occupied by the Centennial Mill and the Hofius Estate.

Two large fitting-out wharves are being built, each 850 feet in length and sixty-five feet in breadth, on the added area and the spaces between dredged out to a depth sufficient to accommodate the largest vessels. Between the two wharves will be a slip 125 feet in width and another 125 foot slip on the north side of number two wharf. These slips will be able to accommodate eight vessels at one time.

Besides the above enlargement they are installing another machine shop 250 feet in length back of the number one slip. The company now has three large machine shops, the second being built near the same spot a few months ago. A second foundry is being put up near the new machine shop with a length of 150 feet. The original shipfitters shed has been lengthened out from 220 feet to 400 feet doubling its capacity. A new brick power house is being erected near the inner end of number one wharf and also a new punch shop with six machines.

The large sheer legs now located at the end of the present plants' outer wharf will be moved to the north side of number one fitting out wharf. These sheer legs have a lifting capacity of seventy-five tons enabling them to handle with ease the largest pieces of machinery. A large sum was recently expended in the purchase of modern and high grade machinery and tools.

These great additions to an already large and efficient shipbuilding plant will cost approximately $1,000,000 and on the finishing of the work an outlay of $4,000,000 will be represented according to data and figures recently placed before the Federal authorities.

Diver William Benjamin of Seattle is engaged in the work of salving the remains of the old bark "Union" which foundered in San Juan Island waters forty-three years ago while en-voyage from Nanaimo, B. C., to San Francisco. Benjamin's operations are believed to set a new Pacific record. So far as is known the "Union" wreck is the most ancient to figure in salvage operations in this ocean. For the last five years Benjamin has been looking for this wreck and discovered its location the first of October of this year.

The wreck holds 600 tons of the best Nanaimo coal which is in as good condition as the day the "Union" sailed from Nanaimo on her ill-fated voyage. The vessel went ashore on one of the islands of the San Juan group later sliding off into ten fathoms of water. The coal is in large chunks which makes it difficult to salve. It will be brought to the surface by means of a clam-shell dipper and will be loaded onto scows and placed on the market.

The "Union" has a copper sheathed bottom and is copper bolted. The copper like the coal being in as good condition as the day the ship went down, showing absolutely no signs of deterioration. The action of the salt water has eaten away all the iron work in the vessel, the anchors being reduced to almost nothing and the chain practically gone. The vessel's upperworks have disappeared many years ago.

The big 8800-ton steamship "Nikkosan Maru" built by Skinner & Eddy has been sold by Mitsui & Company to shipping interests in France. The "Nikkosan Maru" was purchased by the Japanese firm from the builders while the vessel was under construction and later turned over to the French interests, being launched with the tricolor flying in the breeze.

This big vessel is subject to commandeering by the U. S. Shipping Board but should the French owners be allowed to take possession of her she will be rechristened the "Indiana."

A banquet to the nearly 200 of the plant's foremen and experts was given by the Skinner & Eddy Corporation on Friday evening, October 19th. President Skinner gave a long talk in which he vehemently denounced the charge of labor piracy and other current criticism of the plant and officials due to their stand in the recent shipyard strike. Vice-Presidetn John W. Eddy gave a brief speech on patriotism.

T. A. D. Jones has been recalled from the position of the Yale's football coach and will re-enter government service as supervisor of shipbuilding in this city for the Federal Government.

Charles R. Page of San Francisco, recently appointed a member of the U. S. Shipping Board Emergency Fleet Corporation, arrived here Friday evening, October 19th, on a tour of the Coast shipbuilding plants. Mr. Page made the trip to Seattle from Portland with Capt. John F. Blain by automobile, stopping at St. Helens, Raymond, Aberdeen and Tacoma on the way. After making a thorough survey of all the Sound yards in company with Commander J. L. Ackerman, U. S. N., Mr. Page left for Washington, D. C., Monday evening, October 22nd.

The motorship "Oregon" described in last month's issue of this magazine was given a very successful trial trip over the Government mile course off Vashon Island on November 8th. With the big twin 625 h.p. Southwark Harris engines turning at 200 revolutions per minute a speed of eleven nautical miles was easily maintained. After making four runs over the measured mile she steamed to Pulley Point and with her engines turning 215 R. P. M. exceeded the eleven knots on the run home by a wide margin. This vessel was built by the Alaska Pacific Navigation Company for their own account and is given the highest rating in the Bureau Verritas. Her first voyage will be to San Francisco.

The steamer "Dolphin," which until recently has been operating in the Alaska trade and sailing from Seattle, has been sold to Chilean interests. She will be put on the run between Valparaiso and Iquique, Chile, and way ports. The "Dolphin" was brought around this Coast through the Straits of Magellan in 1900 by Capt. John O'Brien and since then has been operated by the Alaska Steamship Company. Before coming to this Coast she was operated on the Atlantic Coast as an excursion steamer, at that time being named the "Al Foster." She was built in Wilmington, Del., in 1892.

Capt. Bion B. Whitney, who was for sixteen and a half years the United States Inspector of Hulls in the Seattle district, has resigned from that service with the Government and has become the head of the Washington-Oregon district of the American Bureau of Shipping succeeding Capt. John F. Blain. The Bureau is often spoken of as the American Lloyds, being engaged in exactly the same work as the great British organization and at the present time is classing a vast amount of tonnage in the Northwest. Blain is the Northwest representative of the United States Shipping Board.

Mr. George McK. McClellan left Seattle recently for Honolulu in an endeavor to establish a direct steamship line from this port to the Hawaiian Islands. During his trip he will act as honorary representative of the Seattle Chamber of Commerce. Mr. McClellan is well known in the Islands having been a resident of Honolulu. Last summer the steamship "Spokane" of the Pacific Steamship Company made a very successful trip between these ports but on account of war conditions the service could not be continued.

The Grand Trunk Pacific Steamship Company has purchased the British tug "Lorne," which has been lying idle in Eagle Harbor for more than three years, from Alexander McDermott of Victoria, B. C. The "Lorne," which was owned and operated by the Puget Sound Tugboat Company, was wrecked in September, 1914, while on her way from Seattle to Vancouver, B. C., towing the barge "America" laden with coal for the British warships. The barge was lost but following the wreck the tug was purchased by McDermott, raised and taken to Eagle Harbor where she has since been lying. The "Lorne's" hull is badly damaged but the machinery is still in good condition. She is being repaired by the Seattle Construction and Dry Dock Company.

Eugene MacAllister has been appointed the assistant general manager of the Sloan Shipyards Corporation which owns and operates shipyards in Olympia and Anacortes. Mr. MacAllister has designed and built a great number of vessels one of which is the Seattle fireboat "Duwamich."

The ferry "Robert Bridges" will again be put into service after several weeks layup at West Seattle on account of a broken Crankshaft. The "Bridges" has given unsatisfactory and intermittent service with her four cylinder, 400 h.p. engines of the full Diesel type. Port Commission planned to remove the present crude oil engines and replace them with the more reliable steam at an estimated cost of $30,000, but Mr. C. C. Terry, a marine engineer and former government expert on Diesel engines, has now contracted to take over the ferry and operate her for one year for a consideration of $12,000 out of which he pays all engine room wages and repair bills. Mr. Terry maintains that the engines are not at fault but that this type presents to engine room crews a new problem that they have not as yet fully mastered.

Seattle is eagerly looking forward to the establishment of a Free Port District in the city, the present outlook being decidedly bright. The government is now contemplating the creation of six such ports to manufacture articles from raw materials, imported from foreign ports, for the European and Oriental markets free of duty. The Industrial Bureau of the Chamber of Commerce and Commercial Club has organized a committee of thirty-five members, all business men and manufacturers, to investigate the proposition of establishing such a Free Port. On account of Seattle being the nearest port in the United States to Siberia, Russia and the Orient offering the world's greatest markets for such manufactured goods the opportunities for the establishment of such a district in this city are extremely encouraging.

Some idea of the expansion of the wooden shipbuilding industry is gained through the fact that January 1st will see about fifty ways available for the construction of large wooden hulls, whereas the first of January, 1917, showed but five wooden vessels to have been under way in the same territory.

During the past few months the Duwamish Waterway has developed industrially to an extent that has made plans for the improvement of the channel and adjacent territory an immediate necessity. Some of the new industrial plants that have located in this section of Seattle's industrial area are the National Shipbuilding Company, the Patterson-MacDonald Shipbuilding Company, the Erickson Engineering Company, the National Steel Construction Company, the National Engineering and Equipment Company and the Elliott Bay Shipbuilding Company. A small island will have to be removed by dredging in the Duwamish turning basin No. 1 and the Duwamish Industrial Association is working on a scheme of betterments. The officers of the association follow: President, Captain O. D. Treiber, head of the National Shipbuilding Company, one of the leading wooden plants of the port; vice-president, A. M. MacDonald of the Patterson-MacDonald Shipbuilding Company; secretary, John B. Shorett, attorney for the Duwamish Waterway district, and treasurer, C. R. Briggs of the National Engineeing & Equipment Company. The association's work includes all three waterways, the committee in charge of the campaign including R. R. Fox of the Washington Shipping Corporation, which is chiefly interested in the West Waterway and Harbor Island.

The Special Committee named by the Seattle Chamber of Commerce to solve Seattle's port development problems has been busily engaged in gathering data on rail and water questions both at Seattle and elsewhere. The members of the Commission are Judge R. A. Ballinger, M. A. Arnold, Joseph Blethen and Dr. W. A. Major.

The recent arrival of the "Fushimi Maru" at Seattle marked a still further improvement of the Nippon Yusen Kaisha's service to this port as the "Fushimi Maru" is bigger, faster and better appointed than any of her predecessors. On November tenth a reception was held on board and no fewer than five thousand Seattle people availed themselves of the opportunity of looking the big craft over.

On November first the Skinner and Eddy Corporation launched the freighter "War Flame," one of the large fleet of vessels ordered on the Pacific Coast by the Cunard Company.

The Elliott Bay Shipbuilding Company has started work on a large ship shed eighty feet high and 280 by 320 feet in size. Under this shed there will be five building ways.

The Foreign Trade Bureau of the Seattle Chamber of Commerce and Commercial Club has appointed a committee known as the Marine Transportation and Port Development Committee which will handle all matters pertaining to water transportation with which the Foreign Trade

Panoramic view of the National Shipbuilding Company's plant at Seattle.

Bureau has to deal. The committee is composed of Frank Waterhouse, chairman; J. S. Gibson, vice-chairman; E. R. Adams, Alexander Baillie, J. H. Bloedel, Allan Daugherty, Joshua Green, A. F. Haines, Charles E. Harvey, R. H. Parasons, W. R. Robinson and H. F. Ostrander.

With the stranding of the "Al-ki" on Chicagoff reef one of the pioneer vessels of the Alaska service passed out of maritime activities. The "Al-ki" was built in Bath, Maine, in 1884, and in the Alaskan stampede of 1898 carried a large number of prospectors to the gold diggings.

The Pacific Derrick and Hoist Company is the new name of the Burbank Machinery Company, a Seattle firm with headquarters at 3223 First Avenue South. The management of the concern remains unchanged, the name being altered merely to have it more in keeping with the specialty of the company, the making of derricks, hoists and all classes of handling machinery.

Recognizing the growing importance of the Pacific Northwest as a manufacturing and mining field, the Wellman-Seaver-Morgan Company of Cleveland, Ohio, makers of heavy handling, conveying and hoisting machinery, have opened a Seattle office in the L. C. Smith building in charge of Mr. Glenville A. Collins.

The Pacific Derrick and Hoist Company was recently awarded a contract for ten 80-foot boom traveling derricks for the Foundation Company's new shipbuilding plant. The derricks will have a five ton capacity at the maximum radius.

RINGWOOD RESIGNS

Mr. R. J. Ringwood, who has resigned from the vice-presidency of the Pacific Steamship Company.

Mr. R. J. Ringwood has resigned from the vice-presidency of the Pacific Steamship Company, his resignation taking effect January first. Mr. Ringwood was born in San Francisco in 1877 and took up the steamship business just twenty years ago in the capacity of a dock clerk for the Pacific Coast Steamship Company. In 1906 he was appointed chief clerk in the traffic department of the company, resigning this position in less than a year to accept the post of general passenger and freight agent of the Alaska Pacific Steamship Company, which concern later combined with the Alaska Coast Company to form the Pacific Alaska Navigation Company. In 1912 he was appointed traffic manager of the Pacific Alaska Navigation Company with headquarters in San Francisco and later went to Seattle as general manager of the firm. In January, 1916, on the merger of the operating interests of the Pacific Alaska Navigation Company and the Pacific Coast Steamship Company into the Pacific Steamship Company, Mr. Ringwood was made vice-president in charge of traffic of the new concern. Mr. Ringwood will engage in business on his own account following the severing of relations between himself and the Pacific Steamship Company at the first of the year.

This plant is typical of the wooden shipbuilding establishments of the Northwest.

Tacoma Happenings

WITHOUT a particle of trouble in the operation of the new sectional drydock of the Todd Shipbuilding & Construction Corporation this dock began its service of lifting vessels in October. The first vessel to be lifted was the Grace Line steamer "Santa Rita" on October 26, while the Chilean bark "Llanquihue" was the first sailer to come out.

Only two sections of the dock are being used at present but these units are abundantly able to lift the work so far offering. The "Llanquihue" is a vessel of 1272 tons. She is one of the old time ships and better known in the early days as the "Cambrian Monarch," built in England in 1876. After leaving the dock the bark shifted to Mukilteo to load lumber for the West Coast.

The Pacific Steel & Boiler Company is one of the Tacoma plants that is enjoying an excellent business. A little over a year ago this plant was taken over by new interests with the result that it has been prospering ever since. It is understood that the firm now has enough work to keep them engaged for the next year. One of the specialties has been the manufacture of steel tanks for ships. Practically all of the work in this line for the Seaborn Shipbuilding Company has been turned out at this plant.

The Pacific Steamship Company has been one of the heavy purchasers of Liberty Bonds at this port. The big coast shipping company took $200,000 worth of the present issue, one-half of this being credited to Tacoma and the rest to Seattle. In the last loan President H. F. Alexander was a heavy purchaser on his own account.

After occupying quarters on the Commercial dock for the past twelve years the J. P. Ruddy Company, ship chandlers, have moved to 1009 A street. This firm, following the general expansion among Tacoma business firms is branching out and now has the largest marine supply house in Tacoma. The company has taken over the marine stock of the Doud-MacFarlane Machine Company. This company will enter into the marine manufacturing business exclusively, making a specialty of brass and iron castings and galvanized goods. Mr. Ruddy has been in the shipping business here for fourteen years; first entering the store conducted by the Todd interests. This was taken over by J. and R. Wilson and then Lewis, Anderson & Foard from whom Mr. Ruddy purchased his end of the business. The long service and wide acquaintance made during this time among marine men promises that the company will make good in their new location.

On account of the difficulty in securing deck hands on the local vessels it has worked a hardship on the different steamboat owners out of Tacoma. Plans have been made by the Merchants' Transportation Company, through General Manager Fred Marvin to equip a 350-ton scow with two hoisting booms and steam power to handle freight for this firm between Tacoma and Seattle. It is believed by this arrangement that several deck hands can be done away with and reduce the cost of operating the freight. The barge will be towed by one of the local tugs. A number of the local steamers have been held up when arriving at their discharging ports by the deck hands demanding more pay or refusing to work. The police were recently called when the freighter "Rapid Transit" arrived to take a crew off the vessel as they would neither work nor leave the steamer.

Narrowly escaping the full force of the typhoon which swept the Japanese and Chinese coasts in September, the Garland line steamer "Justin," Capt. Eckert, arrived here the latter part of October none the worse for the experience, though during one part of the storm it looked as though the vessel would be driven ashore. The "Justin" was followed by the "Francis L. Skinner" which tangled up with the same storm and suffered some damage. The "Skinner" met the full force of this gale. The vessel brought a full cargo of hemp, under charter to H. F. Ostrander, well known Seattle and Tacoma shipping man.

As the result of the voyage of the schooner "Resolute," out from Aberdeen last year, in which the crew mutinied and much trouble resulted on board the vessel, suit was filed in the Federal Court here against the vessel and her owners for salvage amounting to $40,000 by Mrs. Anna Endresen, wife of Captain Endresen of the vessel. In the complaint it was alleged that owing to the members of the crew refusing to stand a watch Mrs. Endresen was forced to do so and by her work aided in saving the vessel.

Work is progressing very favorably on the ship building plant of the Foundation Company here. The tract on which the plant is located, amounting to 47 acres, has been enclosed, ways are down, material is being assembled with the mould lofts, saw mill and other buildings are up and receiving machinery. The rapid work done at this plant has been the subject of considerable favorable comment from outside builders.

With a cargo of around 2000 tons of nitrates the Chilean bark "Llaniquihue," Captain Biehl, arrived here the middle of October and after discharging shifted to Mukilteo to load lumber for the West Coast. This vessel like many of the vessels coming north carries an interesting history as she marks the period of English construction of 1876. It is reported that just prior to the outbreak of the war her owners secured her for $25,000 and are now reported to have refused $125,000 for the vessel. In spite of her years the bark looks in fairly good condition.

Business with the Baker Dock Company at Tacoma has been very good for the past two months, in fact this dock has enjoyed a good business since Manager Sidney W. Baker decided to go into the dock business on his own account. This dock occupies a section of the Balfour docks and looks after the ships of the Nelson line and any transit business coming to the port.

On October 17th, Judge E. E. Cushman in the Federal Court here handed down a decision in the case of Captain R. Petersen against the Gray's Harbor Tug Boat Company in which Captain Petersen was awarded $9,018 and interest. This suit was the outgrowth of the stranding of the barkentine "Jane L. Standford" several years ago and which has been in litigation ever since.

One of the very fortunate matters in connection with the labor troubles that have beset the different ship yards of the Coast in connection with Tacoma is that the workers here did not go out. This to a large extent is due to the level headed policy of the business representatives of the shop workers' organizations who refused to allow their men to be stampeded into a sympathetic strike. Tacoma at present has two union yards, the Seaborn Shipbuilding Company and the Todd Drydock & Construction Corporation plant. It was realized by the heads of the union here that it would be manifestly unfair to have called a strike on these yards which have met all demands of the men, in an effort to aid the workers in some outside port who have gone on strike in a misguided attempt to aid other workers and done so without the sanction of the heads of their organizations. The result of the different strikes had the effect of delaying the building program here as the yards were unable to get lumber with the result that some men were laid off for a period.

By the purchase of the tugs and scows of the Tacoma Tug Boat Company and taking possession on November 1st the Foss Launch Company of Tacoma have become the operators of the largest number of barges on Puget Sound. They have in their control now 32 barges, the largest ones being 400 tons. The boats purchased were the "Echo," "Elf" and "Olympian," the finest inside tugs in this section. The firm name will be changed to the Foss Tugboat & Lighterage Company. Captain O. G. Olson, former owner of the Tacoma Tug Boat Company, will devote his time to other lines of business in which he has been engaged for some time and in travel. Andrew Foss started in business with a boat livery some twenty-seven years ago at Tacoma and has gradually grown into the larger business. The company is operated by Arthur and Henry Foss and Fred Berg. The company have thirteen launches and three steam tugs.

The Pacific Tug Boat Company of Seattle will open offices in Tacoma by the first of the year according to an announcement of Manager McNeely of that concern.

The Chilean bark "Llanquihue," the first sailing vessels to be taken out of the water by the new Todd Drydock at Tacoma. The new dock is operating very successfully.

San Francisco Activities

FOLLOWING the death of Captain William Matson, Mr. William P. Roth was elected vice-president and general manager of the Matson Navigation Company; Mr. E. D. Tenney, president of Castle & Cook, of Honolulu, was elected president; Mr. A. C. Diericx, assistant general manager; Mr. F. A. Bailey, secretary, and Mr. A. M. McCarthy, treasurer. Mr. A. C. Green of the Crocker National Bank was elected to the directorate. It is understood that Mr. Roth will be the active working head of the concern, Mr. Tenney's other interests preventing him from devoting his entire time to the business of the company. The offices of the Matson Navigation Company have moved from their old location at 268 Market street to the ground floor of the building at Market and Drumm streets formerly occupied by the California Fruit Canners' Association.

The Committee of the Chamber of Commerce which is investigating and carrying on the fight for a "free port" at San Francisco is composed of the following gentlemen: Former State Governor, Geo. C. Pardee; J. H. King, President of the Oakland Chamber of Commerce; A. W. Malthy; T. S. Williams and John H. McCallum of the State Board of Harbor Commissioners; Richard J. Welch; J. H. Rosseter of W. R. Grace & Company; J. J. Dwyer, ex-president of the State Board of Harbor Commissioners; C. K. McIntosh, vice-president of the Bank of California; Geo. M. Newhall of H. M. Newhall & Company; J. R. Hanify of J. R. Hanify & Company; L. W. Harris of the Ames, Harris, Neville Company; John Clausen, vice-president of the Crocker National Bank; F. F. G. Harper, custom broker, and C. J. Sullivan.

Mr. J. B. Levison, President of the Firemen's Fund Insurance Company, was the guest of honor at a luncheon in Chicago on October 26th which was attended by many prominent insurance men of that city.

Mr. George Scarlitt De Sousa, whose picture is shown herewith, is the general traffic manager of the Pacific Coast Division of the Marconi Wireless Telegraph Company of America and the representative of that firm in the western territory. Despite the fact that he is now only thirty-four years old, Mr. De Sousa has held the position of traffic manager with the Marconi Company since 1908. Mr. De Sousa's energy and popularity in wireless circles has led to rapid promotion both as to the importance of his office and the importance of the district in which he has acted as traffic manager. He is a member of the Institute of Radio Engineers and of the San Francisco Commercial Club and while he has only been on the Coast for a short while he already enjoys a wide circle of friends.

On November fifth the U. S. Government patrol boat "Alcedo" was sunk by a German submarine in the war zone. The "Alcedo" was a "Watson" designed steam yacht and was built by D. W. Henderson & Company of Glasgow. She was 275 feet long over all, 238 feet between perpendiculars, 31 feet beam, and 18 feet 7 inches moulded depth. She was driven by a triple expansion engine with cylinders 23, 38 and 64 inches in diameter by 36 inches stroke. The "Alcedo" was the property of George W. C. Drexel of Philadelphia who turned her over to the Government for patrol duty during the war.

Mr. H. L. Ferguson of the Newport News Shipbuilding and Dry Dock Company, Wallace Downey of the Downey Shipbuilding Company, J. W. Powell, vice-president of the new Bethlehem Shipbuilding Corporation, A. M. Neeland of the New York Shipbuilding Corporation and J. H. Hand, president of the William Cramp Ship and Engine Building Company, have been appointed aides to the Shipping Board and the Emergency Fleet Corporation.

The "Santa Ana," one of five large freighters ordered by W. R. Grace & Company from the William Cramp Ship and Engine Building Company, will be ready for service in December.

The steamer "Australpool" of the Australian Government line sailed on November 17th for Australia via British Columbian ports. Balfour, Guthrie & Company are acting as agents for this line.

Balfour, Guthrie & Company have placed the "Crown of Galicia" on berth for January loading from Liverpool and Glasgow for San Francisco, San Pedro, Puget Sound ports and Victoria.

The following well known sailers have been taken over by the United States Shipping Board from the Alaska Packers Association, the evident intention being to operate the vessels in conjunction with the Matson fleet to handle the Hawaiian sugar crop. These sailing craft and the "President" and "Governor" partially making up for the Matson tonnage that has been commandeered. The ship "Star of Finland," bark "Star of England," ship "Star of Russia," bark "Star of Italy" and the ships "Star of Scotland," "Star of Alaska" and "Star of Poland." These seven vessels represent about 12,700 tons of shipping.

The Ocean Transport Company have fixed two sailings from the Pacific Coast to the Orient for January. The "Meiten Maru" will take care of the local sailing and the "Koan Maru" will clear from Seattle.

British Columbian Doings

BRITISH COLUMBIA'S shipbuilding programme provides for the construction of some 117,000 gross tons of commercial shipping, having a total carrying capacity of about 185,000 tons. The value of these ships is in the neighborhood of $27,000,000.

While this estimate of construction tonnage is only approximate it includes practically every ship of importance in freight carrying. There are, however, a number of small ships being built, such as fishing boats, which have not been included. With these the total gross tonnage would be about 150,000 tons.

All the ships forming a part of the present programme of shipbuilding to provide war tonnage are taken into account. Some of the ships are already in the water, some are scarcely begun, but the amount of tonnage given represents definite contracts only.

In addition to these contracts there are other shipyards which will probably build in the near future; and, again, there is a probability of further war orders.

The gross tonnage is that usually given in shipping records. The carrying capacity is the deadweight tonnage and represents the precise amount of freight which the new fleet of British Columbian ships will be able to carry.

A recent estimate of shipbuilding tonnage on the Pacific Coast, compiled by the Railway and Marine News, places the total at 1,005,000 gross tons, and the number of ships at 265. Ships being built on the West Coast of the United States are given as follows:

	Number	Gross Tonnage
Washington	102	387,600
California	68	258,400
Oregon	55	209,000

From facts supplied by the various local shipyards it is estimated that fifty large ships are included in the British Columbia programme. There are also four or five other boats, which are not in the fishing-boat class and yet are not transoceanic freighters. Altogether the gross tonnage is estimated at 116,980.

Of this total, twenty-seven ships having a total gross tonnage of about 48,600 tons are being built for the Imperial Munitions Board. Their total carrying capacity will be about 75,600 tons of freight.

The gross tonnage being built, apart from these ships, is about 68,380 tons. These ships will have a total carrying capacity of about 109,400 tons of freight.

It was at the Wallace Shipyards at North Vancouver that the shipbuilding activity of this province had its beginning. The programme there provided for the construction of six auxiliary schooners of some 1600 gross tonnage and with a deadweight tonnage of 2550 tons each. They cost about $150,000 apiece.

Then there is another similar schooner for the Dominion Government. It is of the same type and has a gross tonnage of 1600 tons and a carrying capacity of 2550 tons. This will be used for service between Atlantic and Pacific ports.

Three steel steamers are also on the Wallace programme, one of which is in the water, the second being now under construction. Their gross tonnage is about 3000 tons and the deadweight about 4700 tons.

The Cameron-Genoa yards at Victoria have a programme providing for six auxiliary schooners of the same type as those built at Wallace's. They have the same capacity of 2,550 tons and the same gross tonnage of 1,600 tons. Nine of the fleet of twelve auxiliary schooners divided between this yard and Wallace's have been launched.

The Coughlan Shipyards, on False creek, Vancouver, are building six steel steamers, all of which are now in progress of construction, the first being about thirty per cent finished. They are of 5,730 gross tonnage and have each a carrying capacity of 8,800 tons.

Yarrows, Limited, at Esquimault, are doing a considerable amount of repair work, and among their contracts are building four small steamers for river navigation in India. The combined gross tonnage may be estimated at about a thousand tons, with the combined deadweight in the neighborhood of 1,500 tons.

Harrison & Lamond, at South Vancouver, are building an auxiliary schooner for use by the Dominion government between Pacific and Atlantic ports. It is of the same type as the auxiliary schooners built at the Wallace yards and will have a gross tonnage of 1,600 tons and a carrying capacity of about 2,550 tons.

There is an extensive construction programme at the British Pacific Engineering Company at Vancouver, but details of tonnage are not available.

The Vancouver Shipyards are building a couple of cannery tenders and have recently completed a gasoline boat for South American interests. The combined gross tonnage of the boats that will be used here is about 500 tons and the deadweight in the neighborhood of 800.

In addition to all these, there is the Imperial Munitions Board programme of twenty-seven wood-

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en steamers, costing some $9,000,000. Each ship has a deadweight capacity of 2,800 tons and their gross tonnage is about 1,800 tons.

The Western Canada Shipyards, in Vancouver, is building six of these steamers. The Lyall Shipbuilding Company, which recently took over a part of the Wallace Shipyards in North Vancouver, is building six more. Two are under construction by the Pacific Construction Company at Coquitlam. Four will be built by the Cameron-Genoa yards at Victoria. There will be five constructed by the Foundation Company at Victoria Harbor, and another four are included in the programme of the B. C. Construction and Engineeing Company at Poplar Island, near New Westminster.

Following is a table showing the shipbuilding firms engaged in construction in British Columbia, the number of ships they are building, together with the combined gross tonnage and deadweight capacity:

Firm.	Number of ships.	Combined gross tonnage.	Combined deadweight.
Wallace Shipyards:			
schooners	7	11,200	17,850
steel steamers	3	9,000	14,100
Cameron-Genoa:			
schooners	6	9,600	15,300
wooden steamers	4	7,200	11,200
Coughlan's:			
steel steamers	6	34,380	52,800
Yarrows:			
steamers	4	3,600	6,000
Harrison & Lamond:			
schooners	1	1,600	2,500
Vancouver Shipyards	2	500	800
B. C. Construction and Engineering Co.:			
wooden steamers	4	7,200	11,200
Foundation Co.:			
wooden steamers	5	9,000	14,000
Western Canada Shipyards:			
wooden steamers	6	10,800	16,800
Pacific Construction:			
wooden steamers	2	3,600	5,600
Lyall Shipbuilding:			
wooden steamers	6	10,800	16,800
Total	50	116,980	185,000

It will be observed that the largest tonnage under construction in any one yard is the 34,380 gross tons of steel vessels at Coughlan's Shipyards. The Wallace yards are building a total gross tonnage of 20,200 tons. Contracts are fairly well scattered throughout the remaining yards.

FREIGHT REPORT

By Page Brothers

November 21st, 1917.

OUR last circular was dated October 20th, and Governmental regulations, such as they have been, and the fears of others that may be issued from day to day, have affected the volume of business, as far as steamers are concerned, very much. The Norwegian steamer "Dicto," which was chartered two or three months back by Mitsui & Co. for two or three rounds to the Orient, was, on expiration of the first round, taken in hand by the United States Government and was not allowed to proceed on her original charter, and pressure was evidently brought to bear upon the owners to make them accept the governmental rate of 45/- Stg. per ton on the deadweight per month, for delivery Seattle to the Orient including India, but with the proviso that she was immediately to return from the Orient with cargo for redelivery at a United States Atlantic port, and The Robert Dollar Co. were fortunate enough to get the vessel on above terms for the voyage just described. It seems, therefore, that neutral vessels cannot be chartered, at present, for a round to the Orient unless they are willing to comply with the mandate of the United States Government, namely, to accept 45/- on the deadweight on time-charter, which is quite a reduction from what charterers were willing to pay, namely, $16.00 or even $17.00 per ton on the deadweight. It is also quite possible now, that the Government may set a rate higher than which no shipowner shall charge per

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ton of cargo delivered, say from the Far Eastern ports to this coast.

Our coasting sailing vessels not having been interfered with by Government rulings, are getting very high rates for the west coast of South America. Freights have jumped from $37.50 per thousand feet up to $45.00 per thousand, lumber from the North to Chile or Peru.

Freight rates to Australia with lumber are now $42.50 per thousand feet to Sydney, with proportionally higher rates to Melbourne or Adelaide, and shippers like Comyn, Mackall & Co., Balfour, Guthrie & Co., and J. J. Moore & Co. have been chartering vessels for loading in 1918 at the rates we have just quoted.

The latest sale reported is the steam schooner "Necanicum," sold by the Hammond Lumber Co. to the Brookings Lumber Co. at a reported price of $160,000. The purchases of steamships have also been affected by the difficulty of changing flags.

DEFERRED REPAIRS

THE Pacific Marine Review has recently commented on the injustice to underwriters occurring by reason of owners deferring repairs of their vessels of damages for which underwriters are liable to a time when it may be convenient to the owners to lay up the vessel for a sufficient length of time to make the repairs. The question is one of vital interest, and a recurrence to it can do no harm and may be of benefit, more particularly to the shipowner.

The injustice lies in either one of two contingencies: first, a possible aggravation of the damage through the action of perils subsequently encountered, and second, the possible, and in these times probable, increase in the cost of labor and material between the time when repairs might, and therefore should, be made and the time when they actually are made.

As to the first contingency, there are undoubtedly many cases where the damage does not in any way impair the seaworthiness or the strength of the vessel, as in the case of an iron or steel vessel where the plates are slightly dented for the cost of repairing which the underwriter may be liable, but the only effect on the vessel itself is the impairing of the symmetry of the hull. But in the majority of cases the damaged part is of necessity a weak part and is, by its very weakness, subject to greater damage by the same agencies that produced the original damage. This original damage may be considered as not to have impaired the seaworthiness of the vessel, and surveyors may grant a "certificate of seaworthiness," but if through this element of weakness the original damage is aggravated where, had the repairs been made at once no damage would hace accrued, then the question arises as to the liability of the underwriters for the cost of repairing the increased damage. That underwriters are alive to this contingency is shown by the fact that in many cases they require an investigation of this subject and ask for the opinion of the surveyors as to whether or not the cost of the repairs has been increased by reason of the vessel having been run unrepaired.

The second contingency is, after all, the same as the first, for in the one case we have an accumulation of damages and in the other an aggravation of cost, and as a matter of fact in some cases the two may be combined.

In a recent issue of Fairplay the case is cited of a vessel being in drydock for the repair of heavy weather damage, and before repairs could be started she was ordered out of the dock for the twofold reason that the authorities wanted the dock for another vessel and also required the services of that vessel as soon as possible. Some temporary repairs were made, a certificate of seaworthiness given, and the steamer proceeded for a foreign port. During this passage she met with heavy weather, the temporary repairs gave way, and additional damage was done, but she was able to continue to her destination. In this case, of course, the requirements of the authorities could not be denied, but had the owners pursued this same course for their own convenience, the result would have been the same, and claim would have been made against the underwriters for the entire cost of the repairs.

Something over a year ago the question of increased cost of repairs due to postponement in making them was the subject of much discussion among the underwriters in England and the Association of Average Adjusters, and a committee was appointed to consider the question. This committee consisted of representatives of shipowners' associations, underwriters' associations, and adjusters, and they stated that in their opinion the liability of underwriters for damage to ships was limited to the reasonable cost of repairs as if effected at the first reasonable time and place after the damage had occurred. Certain contingencies were considered, such as the inability to procure drydock facilities, but they considered that in all cases the liability of underwriters would be limited to the cost of the repairs to be made as soon as possible after the damage had occurred.

At this present time of abnormally high rates of freights, it is the natural desire of shipowners to keep their ships running, and for that reason, if the ship is not actually unseaworthy, they will defer making repairs until the repairs are absolutely necessary or until the ship is due for docking and overhauling. This country is now suffering from a plethora of strikes, particularly in all branches of manufacture, and every concession granted to labor means an increase in the cost of repairs, not only in the item of labor but in material. Up to within a short time, underwriters have been very lenient, but the burden is becoming so great that they are beginning to scan repair accounts rather closely, and if owners desire to run their ships for their own profit beyond a reasonable time in which repairs of damages should have been effected and in the meantime there is an increase in the cost they must be prepared to scale their claim by that increased amount.

LOSS BY WAR RISK OR MARINE RISK

THE question of the liability of underwriters in the case of a missing vessel is still an open one, and according to foreign exchanges the Arbitration Board which was advocated to determine the liability as between the two sets of underwriters is still in the making. It is reported that one case, where both sets of underwriters refused either to pay, to split the loss, or to arbitrate, is now likely to be settled, for the time being, by arbitration, the decision of the arbitrators, however, not to be final, but to be left open so that in the event of any definite information being obtained later there may be a readjustment. In other words, if, as is suspected, the authorities are holding back for the public good information of which it may be in possession, but that may be given out after the war, or before that event if circumstances will allow, and which will throw definite light on the cause of the loss, then the underwriter who is by such evidence found to be wholly liable will reimburse the other underwriters who may have participated in paying the loss. This method will, at all events, reimburse the assured, and certainly he is entitled to reimbursement, having paid a premium to cover both contingencies and his insured property having undoubtedly been lost.

In this connection it is also stated that the Italian government, in a ministerial decree, has provided that in the case of missing vessels the loss shall be presumed as having been caused by the risks of war, and that the war-risk underwriters shall pay in full. But it is also provided that if after-events shall prove that the loss was caused by a peril of the sea solely, then the war-risk underwriters shall recover from the marine-risk underwriters for the loss.

With this unsettled state among English underwriters, it will be interesting to know how the settlement of the loss of the "Wairuna" will be met. This steamer is several months overdue from Sydney for San Francisco, and there is no doubt but that she is a total loss. It is known that in the early part of her voyage heavy gales prevailed near, or in what must have been her course, and it is barely possible that she may have become lost on some atoll in the South Pacific. But the commander of the notorious German raider "Seeadler," which vessel is known to have taken heavy toll before her loss, claims that the "Wairuna" was one of his victims. If full reliance can be placed on his word, then, of course, there can be no doubt as to where the loss will fall, but the question is, will the underwriters accept this statement?

MARINE MISHAPS

"JAVARY," Str.—From Shanghai for Tacoma with a cargo of oil in barrels and bulk, went ashore on Whidby Island, Nov. 1st. A part of the cargo was lightered, the steamer floated and proceeded. On examination it was found that she had suffered no damage.

"AL-KI," Str.—From Seattle for Sitka and way ports, went ashore during dense snow squalls on the south end of Chichagoff Island. At last reports, vessel had twisted and was partially broken about amidships.

"GOVERNOR," Str.—From San Diego for San Francisco and Puget Sound, went ashore on the breakwater after leaving Wilmington on Nov. 1st. She was floated and proceeded to San Francisco, where she was placed in drydock for repairs.

The Columbia River District

IN eleven months during the present year 25 vessels have been launched on the Willamette and Columbia rivers. In 1916, when the revival of the shipbuilding industry was barely started in this district, only four carriers took the water in the same district.

November's contribution to the list of launchings was four, the 3300-ton steamer "Margit," at the plant of the Albina Engine & Machine Works being launched November 3 and the following day the "Halgren" slid down the ways at the yard of the Northwest Steel Company, to be followed November 15 by the "Ethel," at the Columbia Engineering Works, and the last was at the Columbia River Shipbuilding Corporation's property, the Cunarder "War Sirdar" being launched November 19. That was the first hull completed at the plant.

Except at the Columbia Engineering Works, the launchings were delayed because of the strike, which held on five weeks in wooden yards and a month in the steel plants. The Columbia Engineering Works was not affected, with the result the auxiliary schooner "Diria" was launched October 24 and the "Ethel" November 15, while there will be another sent overboard early in December, which will mark the floating of the fifth carrier for M. T. Snyder of New Orleans, and the last the company has under contract from him.

The "Margit" was the first the Albina Engine & Machine Works floated. There is another of the 3300-ton class to be freed from the cradle shortly and after that the 3800-ton carriers, four of them, will be hurried.

The "May," which was launched August 9 at the McEachern yard, Astoria, was given her trial trip on the river November 10, making the run to Portland and she is credited with having made eight knots an hour. The vessel was lifted on the Oregon drydock for final inspection and then hauled over to the Albina Engine & Machine Works for minor machinery adjustment. She was originally built for A. O. Andersen & Company and sold by them to the Robert Dollar Company. The vessel loads an Oriental lumber cargo for her maiden voyage. The "Pauline," the sixth carrier floated at the McEachern plant, made her debut October 20, and is being finished without loss of time. She completes the list of ships for the Andersen interests, though there were two others laid down for that firm that were sold to M. H. Houser of this city, when he purchased the shipbuilding property from the Andersen corporation. Since then the two vessels have been disposed of to Eastern interests and will be delivered early in 1918.

The auxiliary schooner "Esperanca," which the Peninsula Shipbuilding Company launched December 16, 1916, got under way from Portland November 15 for the West Coast, carrying a full

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lumber cargo. She was named the "Alpha" when floated, being followed March 27, 1917, by the "Beta" and June 1 by the "Gamma," but by that time the Greek letter fleet expired by virtue of the sale to Norwegians of the "Alpha" and "Beta," so they were renamed the "Esperanca" and "Eric." The "Gamma" and the fourth, officially named the "L'Aiglon" on being launched, were sold to ply on the Atlantic and by January 1 the remaining three will either be on deepwater or ready to go. That will enable the company to centralize its force and efforts on government tonnage, there being eight steamers it has obligated itself to deliver to Uncle Sam.

New business placed during the month of November includes contracts by Christopher Hannevig of New York, with the Columbia Engineering Works for two wooden auxiliary schooners that will be equipped with full Diesel engines. Details have not been announced, the business having been closed in the East by Arthur Mears, manager of the plant, but it is known they will be about 180 feet on the keel and follow the general auxiliary schooner type.

The Motorship Construction Company contemplates engaging the construction of auxiliary schooners and probably small steamers at its Vancouver, Wash., yard, where at present only lifeboats and cannery tenders are being built. Since the company executed a lease for the property May 10, 1917, more than 100 lifeboats have been completed and on the books are orders for 508 more, including 32 for the Navy but exclusive of two large cannery tenders.

The company is the first on the Coast to land orders from the Navy in connection with plans and specifications for 300 boats recently issued. The plans were gone over at the Bremerton Navy Yard by Merrill A. Reed, president of the company, and the bid submitted drew for the plant contracts for 10 cutters, each 28 feet long; 10 whaleboats 30 feet long and 10 whaleboats 28 feet long, besides two motor sailing launches, one 36 feet and the other 40 feet long. The company will furnish sails and gear, also gun mountings, but guns, engines and such equipment will be installed by the Government. Delivery must be made at the Boston Navy Yard April 1, 1918. It is stipulated that Eastern oak be used, the Navy Department having declined, even on work at the Bremerton Navy Yard, to accept Western material in the craft.

Word has been passed from the Northwest headquarters of the millers' division of the United States Food Administration that there will be steamers sent to the Coast, in addition to those building, to handle flour cargoes to the Atlantic. The move is contemplated for early execution as a means of relieving the railroad systems. Since the grinding of flour was commenced under Government supervision, so that the manufactured product might be rushed East for trans-shipment to the front, the railroads have found their facilities sorely taxed and for that reason extra efforts are being made to obtain tonnage. One report is that vessels will be drawn from the Philippines to assist in the movement.

When Captain Mitchell made the auxiliary schooner "S. I. Allard" of the McCormick fleet fast at the Fifteenth street terminal the night of November 15, after a round voyage from Portland to the Antipodes that began early in June, he unfolded a narrative of the operation of the ship that demonstrated the type is most desirable in the Pacific trade, regardless of the experience of soem others. Incidentally, having handled a full lumber cargo outward and romped home with an underdeck load of 1835 tons of copra, the largest of the kind to be discharged here, and 100,000 feet of ironbark on deck, there was a neat credit entered for the stockholders in the column of earnings.

The "Allard" stood away from the Columbia river early in June and she was five months and 10 days away from home, in which time she covered 15,104 miles. Her best time was 231 knots one day and the least progress was 113 knots in 24 hours, the latter being in a gale. Her log shows that from the Columbia river she headed for Honolulu, logging 2527 miles in 13 days 8½ hours. From the Hawaiians to Sydney 4457 miles, 25 days and 23 hours. On discharging her lumber she proceeded to Tongo, in the Friendly group, 2296 miles, in 12 days and seven hours and was an even 20 days from Tongo to Honolulu, 3200 miles, and 15 days from there to the river.

With a fair wind and moderate sea Captain Mitchell says the "Allard" will make 195 knots. One of the most satisfactory features of the voyage is the fact that her fuel consumption averaged only 20 barrels of oil a day. The showing is far ahead of the maiden voyage of the "City of Portland," the first five-masted of the McCormick auxiliary fleet, but it is hoped to improve even on the "Allard's" trip with the "City of St. Helens," which is having some extra work done here on her tanks. She is loaded with lumber and will be at sea before the "Allard" has worked another lumber load.

In a special list compiled by the Chamber of Commerce of shipbuilding plants, the number of men that will be employed January 1 and existing contracts, the following information is set forth:

Steel	**Men Employed**
Albina Engine & Machine Works, Portland	1000
Columbia River Shipbuilding Corp., Portland	2400
Northwest Steel Co., Portland	3000
Willamette Iron & Steel Works, Portland	1000

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Wood

Standifer-Clarkson Shipbuilding Co., Portland	300
Guy F. Standifer Construction Co., Portland	250
Columbia Engineering Works, Portland	300
Peninsula Shipbuilding Co., Portland	800
Kiernan & Kerns Shipbuilding Co., Portland	150
Coast Shipbuilding Co., Portland	225
Supple & Ballin Shipbuilding Co., Portland	600
Grant Smith-Porter-Guthrie Co., Portland	1000
Foundation Co., Portland	1500
Coos Bay Shipbuilding Co., Marshfield	175
Kruse & Banks, North Bend	316
McEachern Shipbuilding Co., Astoria	564
Wilson Bros., Astoria	100
St. Helens Shipbuilding Co., St. Helens	300
Sommarstrom Bros., Columbia City	125
Feeney & Bremer, Tillamook	100
Rogers Bros. Shipbuilding Co., Astoria	150

The Foundation Company's representative came to Portland July 23 and it was no small task to close for the O. W. R. & N. "boneyard" property and get the preliminaries under way. Yet the first keel was in place October 19 and today each of the 10 ways has the nucleus of a ship resting there. There are 20 to be constructed, all for the French government and all to be steam auxiliary schooners. There are 250 feet on the keel.

Bayley Hipkins is the Northwest manager for the Foundation Company and he prides himself on the fact the yard at Tacoma, which is a duplicate of the Portland plant, has been advanced at the same gait and the two are neck and neck for honors. It is said the company, which accepted 40 French contracts will shortly close for as many more, which will be built here and on Puget Sound.

After having undergone her trial trip on Puget Sound, where she reeled off 13½ knots, one knot above the contract speed, also loaded some cargo there, the Cunarder "War Viceroy" returned here November 18 to have her oil burners removed and grate bars installed in the furnaces, it having been decided to burn coal instead of oil in those vessels. It is intended to have the steamers carry to Europe as much fuel oil as can be accommodate in the double bottoms and spare tanks, which will be discharged there for the use of the Navy forces.

Orders placed with Portland houses so far this year by the Alaska Engineering Commission number 325 and represent an investment by the Government of $475,000, while last year the total business was 225 orders for which $275,000 was spent, while in 1915 the total purchases were 40 orders worth $49,000.

Thomas Nelson, manager of the Union Co-operative Packing Company of Astoria, has been named by Governor Withycombe a member of the Oregon State Board of Pilot Commissioners, succeeding Judge Edw. C. Judd of Astoria. The Portland members are C. G. Wilson, vice-president and manager of the Clark & Wilson Lumber Company, and Captain Jack Speier, Harbormaster of Portland.

During a hearing conducted November 16 before Judge McClelland, a member of the Board of General Appraisers, who was here from New York, testimony was heard supporting the contention of shipbuilders that oil engines imported for installation in American ships should not be assessed duty. It has held by the Secretary of the Treasury that engines could be admitted free of duty only if installed in old hulls, so several sets brought here for auxiliary schooners have been taxed. Judge McClelland took the matter under advisement.

Following a week spent in the Willamette and Columbia river district, James French of New York, chief surveyor for Lloyd's in the United States and Canada, and H. A. Ruck-Keene of London, assistant chief engineer surveyor, left for California November 9 and they complimented builders of the district for the progress made in construction and the class of work. Mr. French, who was here 14 months previously, expressed himself as staggered by the growth of marine construction establishments.

Vessel owners here, both inland and deep-water, have pledged support to the Hoover food control system and November 11 an order went into effect for certain meatless and white breadless days on all vessels. The restriction was applied to the crews as well as in the passenger saloon service.

Delivery of three Scotch marine boilers built by the Willamette Iron & Steel Works for Mitsui & Company was made at Seattle early in November by the steamer "Johan Poulsen." The boilers are destined for Japan to be installed in a new vessel under way.

Through an agreement between towboat operators and the Port of Portland a new schedule of rates for shipping vessels within the harbor limits has gone into effect. In the past the port's tariff was $20 and $25 a move, depending on the berth moved to. Now an increase has been made, charges being governed by the movements to certain zones, while vessels are classified as well according to their size and rig.

Though Federal courts have held that the Port of Portland's liability for damages, when one of its tugs has a vessel in tow, is not limited to $10,000, a new tariff has been issued by the port in which the sum is prominently displayed as the maximum liability in case of accident.

Among the Managers and Owners

Mr. H. W. Churchin, for the past ten years an assistant to Mr. J. W. Isherwood, has been appointed Chief Executive Shipbuilding Officer for the Australian Government.

H. M. Newhall & Company of San Francisco announce that they have been appointed as Pacific Coast agents for the Marine Department of the Westchester Fire Insurance Company of New York. Mr. Thomas S. Deering is manager.

Judge Thomas C. Burke, who has been succeeded as Collector of Customs for the Oregon district by Will Moore, was presented with a gold Swiss watch by his former employes, November 9.

Drake C. O'Reilly, head of the Regulator line and Diamond O fleet, also of the Port of Portland Commission, has returned from New York and other Eastern points after an absence of a few weeks.

Captain Ames, assistant inspector of hulls at San Francisco, was in Portland during the month on his way home from Puget Sound. He spent his vacation taking in Coast harbors. He was assistant inspector here seven years, being transferred to San Francisco four years ago.

John Wynn, United States Inspector of Boilers for the Oregon district, has resumed his official duties after a month's leave, which he spent about San Francisco, his former home.

Captain Alley, who took the auxiliary schooner "Guanacastle," built by the Columbia Engineering Works for M. T. Snyder of New Orleans, as far as Balboa, has returned and will take the schooner "Ethel," fourth of the Snyder fleet, around to the East Coast.

Lieutenant George E. Gandy, U. S. N., has been assigned here as boarding officer and with the assistance of Harbormaster Speier has rounded up men on the waterfront who are without registration cards.

Joseph C. McDavitt, freight clerk on the turbiner "Great Northern" until she was taken over by the Navy, has been named district freight agent for the Parr-McCormick line, being in the office of J. S. Pratt, Portland agent.

Frank J. Smith, veteran steamboatman of the Willamette and Columbia rivers, has issued a record of steamboats dating back 67 years. The publication is known as the "Marine Record of Oregon" and printed on a single sheet, a border being formed of cuts of well known old steamers.

Hugh Mackenzie, formerly Chief Clerk in the Passenger Department of the Great Northern Pacific Steamship Company, has been appointed Assistant General Passenger Agent of the Pacific Steamship Company. He succeeds J. E. Wilson, who recently resigned. Mr. Mackenzie was with the Hill railroad system before entering the steamship business some years ago.

George S. De Sousa, traffic manager of the western division Marconi Wireless Telegraph Company. One of the best known among the younger executives in the wireless world.

Mr. Theodore Brent, one of the original members of the United States Shipping Board, has become President of the Hollywood Shipbuilding Company of Oakland, Cal., and has also secured an interest in the Parr-McCormick Steamship Company. Mr. Brent resigned from the Shipping Board following the controversy between Mr. Denman and General Goethals.

Mr. Robert L. Hague, naval architect and engineer for the Standard Oil Company of California, has been appointed chief assistant to Captain Pillsbury of the Shipping Board. The Standard Oil Company is virtually loaning Mr. Hague to the Government, as his old position will be held waiting for him at the close of the war.

Messrs. T. Mori and K. Yamasaki, prominent officials of the Yamashita Steamship Company of Kobe, Japan, have been touring the Pacific Coast making an extended study of shipping conditions.

Mr. Edwin Orrett, Pacific Coast Manager for the Osaka Shosen Kaisha, has now become manager for the Terminal Stevedoring and Contracting Company with headquarters at Tacoma. While

TRADE MARK
RIVERSIDE
REG.U.S.PAT.OFF.

SHIP TANKS

This Company is prepared to furnish promptly black and galvanized steel tanks for use on shipboard, whether they are rectangular, square or cylindrical design. On account of the high cost of labor, it is our recommendation that cylindrical tanks be used wherever possible, on account of the saving in labor.

We are prepared to submit promptly quotation and delivery on any inquiries for ship tanks you may put before us. Let us co-operate with you in designing ship tanks which can be made up at the lowest cost from materials on hand.

Riverside Boiler Works, Inc.

CAMBRIDGEPORT, MASS.

retained by the Osaka Shosen Kaisha in an advisory capacity, Mr. Orrett's active duties as manager will be taken over by Mr. Higuchi, formerly Hongkong manager for the Osaka Shosen Kaisha. The stevedoring business of the big Japanese line at Seattle and Tacoma will be taken care of by the new firm of which Mr. Orrett is the managing head.

After a three months' visit in America during which time he made an exhaustive study of the steel situation especially in its connection with the shipbuilding industry, Hyoso Asano sailed for Yokohama on the Siberia Maru on November 20th. Hyoso Asano is the managing director of the Toyo Kisen Kaisha and has his headquarters in Yokohama. He is also an active director in the Asano Shipbuilding Company which maintains immense yards at Tsurume, Japan, and in the Asano Goshi Kaisha and the Asano Cement Company.

Asano is a splendid example of the younger generation of successful business men in Japan. He was educated at Harvard University, and after graduation began at the bottom and worked his way through the various departments of the steamship business up to his present position in the Japanese industrial and commercial world.

He is a thorough sportsman in the best sense of the word, a lover of outdoor life, an expert motorist and an enthusiastic golfer, being one of the organizers of the Golf and Country Club at Tokyo. Although Asano's visits to America are far apart, he maintains his connections with the leading American clubs, his latest membership being in the new Lakeside Golf Club of San Francisco.

Captain Lewis S. Jordan has been appointed by the American Bureau of Shipping as Surveyor of Hulls and Machinery for the districts of Oregon and Washington. Captain Jordan was assistant United States Inspector of Hulls up to a short while ago, when he resigned to take up business with the International Stevedoring Company. Captain Jordan is a San Franciscan, being the son of the late Captain F. W. Jordan, who was a bar pilot for many years.

Mr. Charles I. Irvin, formerly chief engineer of the American-Hawaiian Steamship Company, has been appointed chief engineer for the Shipping Board at San Francisco and Mr. J. W. Murray, formerly port captain of the same line, is filling a like position here for the Emergency Fleet Corporation.

The sixth vessel constructed at the McEachern yards at Astoria, the "Pauline," was successfully launched on October 20th and is now about ready to go into commission. Her owner is the Auditor Steamship Company of New York.

Hyoso Asano, Managing Director of the Toyo Kisen Kaisha, also an active director of the Asano Shipbuilding Company. Mr. Asano is one of the best known of the group of younger business men who have been so active during the past few years in developing great Japanese enterprises.

OREGON OAK SQUARE SHIP KNEES

We have on hand 452 finished Oak Shipknees, 2′ stem and 2′ root, from 4″ to 10″ thick. If interested, inquire at once. SULLIVAN & FORBES, INC., Portland, Oregon.

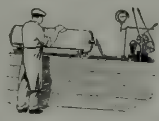
TANKS FOR USE ON SHIPBOARD

Change in Method of Their Construction Brought About By New Conditions

By W. P. Hosmer
(Riverside Boiler Works, Inc., Cambridgeport, Mass.)

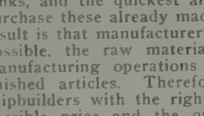
The new and increased demand for ships has not only changed the former methods in the building of ships themselves, but also in fitting them out with the necessary equipment. Because of the demand for quantity and quality, the natural trend is to standardize as nearly as possible all parts. Previously, because of the great decrease in shipbuilding as an industry, the equipment of a vessel, with its necessary accessory parts, did not call for very much thought on the part of the shipbuilder or his purchasing agent.

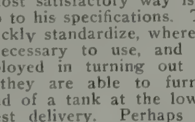
In equipping a vessel with tanks, the shipbuilder either looked for tanks that might be purchased second-hand, or possibly he had some laid by in stock that came somewhere near the specifications he required. If neither of these methods availed, he might use sheet-metal workers if he had them in his employ, and if at that time they were not busy on other regular work, and so make up the different tanks that were required. If all these methods failed, the shipbuilder would finally turn to the nearest tank manufacturer, and he always paid steep prices, for orders of this kind were small in number and called for special work, and the manufacturer naturally had to have his profit. In any case, the shipbuilder was employing a very inefficient method that lessened his profit, slowed up delivery, and therefore kept him waiting for that profit longer than it was really necessary.



While these methods were possible in the past, they are practically obsolete at this time, when, as stated, the trend is toward standardization, quality and service, low cost, quick delivery, etc.

Articles that are regularly manufactured must be purchased by the shipbuilder, as his whole time is taken in building the ship—not in the manufacture of a number of products with which his ship is to be equipped. The shipbuilder buys his lumber cut to specifications, and does not buy forests and operate sawmills to obtain the finished lumber he requires.





Obviously, it is an inefficient method to build his own tanks, and the quickest and most satisfactory way is to purchase these already made up to his specifications. The result is that manufacturers quickly standardize, wherever possible, the raw materials necessary to use, and the manufacturing operations employed in turning out the finished articles. Therefore, they are able to furnish shipbuilders with the right kind of a tank at the lowest possible price and the quickest delivery. Perhaps the best illustration of this is to follow some detailed facts in the construction of the average tank.

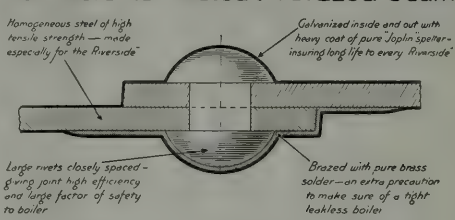
A point for the shipbuilder to note is that wherever possible circular tanks should be specified, first, because manufacturers have machinery already installed that performs most of the operations necessary in the construction of this type of tank, while those made in square, rectangular, or odd-shaped sizes are made in nearly every operation of construction by hand. It therefore follows that a circular tank generally costs less and is made up more quickly than a tank of the same capacity which is not circular. Storage tank construction is usually riveted throughout, and the following detailed facts are the most important of the processes they go through:

In the first step, riveting, extra care must be taken in punching the holes so that the alignment will be absolutely true, and each and every rivet driven to exactly fill up the space it occupies. The amount of pressure exerted by the machine is an important feature also, and must be carefully determined so that each rivet will be formed to its maximum strength. Every rivet must be exactly the same shape and size and the same distance apart, insuring equal strength throughout the tank. In the case of all "Riverside" tanks the rivets used are made according to a special model with the maximum amount of steel in both the head and shank to give additional strength.

The special feature of the "Riverside" method of manufacturing riveted tanks is the brazing process, which is the next important step in manufacture. Brazing means minutely working molten brass solder into the riveted seam and over and between each rivet in the shell. This covers the entire seam inside with a ductile metal that permits expansion and contraction without the seam opening up. A riveted seam is a strong seam, but the brazing in addition makes absolutely sure that the contents of the tank under high pressure cannot at any time "get by."

If the tank specified is to be galvanized, it then goes to the third important step, and great care must be taken in this operation. Before being immersed in the galvanizing kettle, the tank receives a process known as "pickling"—namely, being put through a process which removes the rolling mill scale and all other foreign matter from the surface of the steel. The tank is then ready for the "Hot-Dip." This means that the tank is immersed in moldten zinc, the hot meal reaching the inner and outer surfaces equally, the temperature of the molten zinc being maintained to exactly the proper degree. A cross-section view will give an interesting illustration of the detail of these two features of the riveted and brazed seam. Covering the seam on the **inside** with brass solder and on the **inside and outside** with pure spelter makes "assurance doubly sure."

The "Riverside" Riveted and Brazed Seam

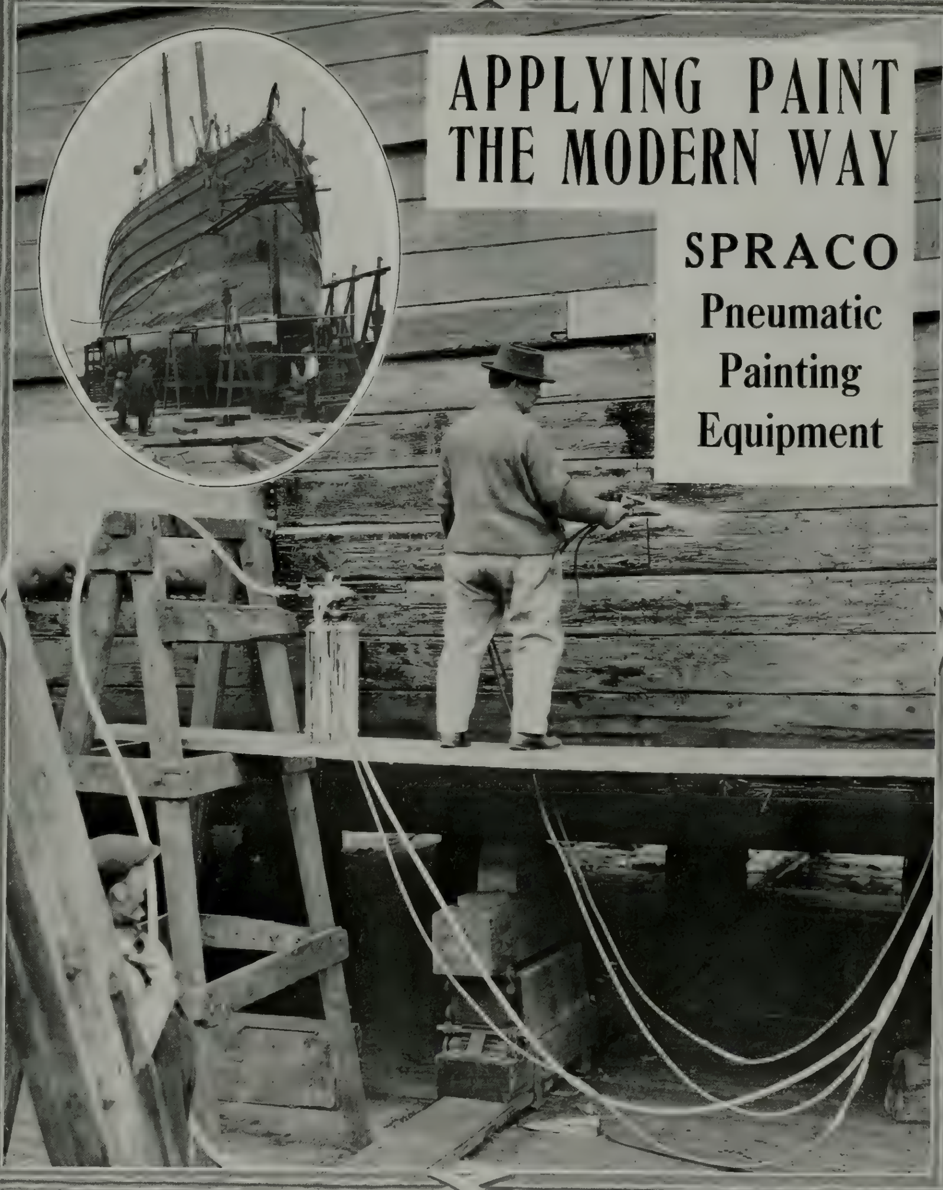

Homogeneous steel of high tensile strength — made especially for the "Riverside"
Galvanized inside and out with heavy coat of pure "Joplin" spelter—insuring long life to every "Riverside"
Large rivets closely spaced—giving joint high efficiency and large factor of safety to boiler
Brazed with pure brass solder—an extra precaution to make sure of a tight leakless boiler

The Strongest and Tightest Seam on any Tank

The final process before shipping is a most important one, for if it is not successful the other operations have gone for naught. This final process is testing. All tanks must be rigidly tested before leaving the factory. Each and every one is filled with water and under hydrostatic pressure subjected to an individual and excessive test. Just as skilled workmen are employed in this as in any of the other operations, and no leaky or defective tanks are permitted to pass the inspector.

These four important operations in the "Riverside" method—namely, evenly spaced rivets, the **Brazed** seam, careful **Galvanizing**, and rigid **Testing**—insure a tank that will stand up without any fear of leaks or other failures.

At the new plant of the Hesse-Martin Iron Works a full force is working, and in another month all of the old plant is expected to be located on the former property. The Government has exercised options held for auxiliary machinery, and those orders, which were closed for during October, are said to represent about $260,000. Other than that, the firm has not taken on additional business, having so much on the books now that it is estimated it will be several months before the bulk of the deliveries can be made.



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Matters of Equipment and Opinion

TRAVELING WOODEN TOWER DERRICKS

By F. R. Schoen

In viewing the picture shown herewith of a wooden tower derrick, the first question that naturally arises is, Does this type of derrick meet the needs of a modern shipyard? The surest answer to this question is found in the axiom that extended use of any type of machinery is a criterion of its utility. Many shipyards are using the wooden traveling towers and finding that they fill all their requirements. In the Northwest alone we find the yards of the Washington Shipping Corporation, the Sloan Shipbuilding Company, the Port Blakely Mill, the Western Canada Shipyards, Ltd., the Tacoma Shipbuilding Company, Meacham & Babcock, Nilson & Kelez, and the Seattle Construction & Drydock Company all using this type of material-handling rig. This list certainly compares favorably with any list of shipyards in the same territory that are using any other single type of handling equipment. This extended use of one type of derrick naturally indicates that the traveling wooden tower is possessed of certain material advantages.

One advantage of the tower derrick as fitted by the Pacific Derrick and Hoist Company, formerly the Burbank Machinery Company, of Seattle, is that the derrick itself can be constructed at the plant where it is to be used, from drawings which are furnished from the manufacturer of the fittings. This results in a great saving in cost over the steel derrick and at the same time saves a large amount of valuable time.

The traveling wooden derrick most widely used is briefly described below, its design being susceptible of ready change to meet different requirements either as to capacity or methods of work obtaining at different yards. The height of the main tower is 60 feet, with a boom ranging from 60 to 90 feet in length and having an effective working radius of from 50 to 80 feet. The tracks on which the tower travels range from 16 to 24-foot gauge, and the total swing is up to 210 degrees. The speed along the tracks is from two to four miles per hour, and the working load from three to twenty tons, depending upon the radius at which the lift is taken on and the capacity of the equipment installed.

The cost of installation of one of these towers ranges from $5,000 to $10,000, and if the yard happens to have on hand odds and ends of equipment of the standard hoisting engine and derrick type, these can be utilized in building up the machine, thus cutting down the cost of installation.

The Pacific Derrick and Hoist Company has made a specialty of supplying the equipment for wooden tower derricks and has a great mass of data and information on hand, enabling it to determine what will best meet a builder's special requirements. A complete derrick can be furnished and installed in from two to four weeks, which is naturally a great point in its favor in these days of hurried ship construction.

In a time when our country is in need of all the steel that can be produced, we must not lose sight of the fact that timber should not only be used as a substitute where possible, but also as a long-neglected home product which when properly used in this class of equipment gives us the means of filling the needs of shipyards without undue delay, and at the same time produces a type of handling apparatus that has been long neglected. In the construction of the wooden schooner there is not a timber, large or small, that cannot be handled by the derricks here described.

For the construction of steel ships, the Pacific Derrick and Hoist Company is constructing overhead tramways, and this apparatus has been installed at the Ames Shipbuilding and Drydock Company, J. F. Duthie & Co., the Skinner & Eddy Corporation, and the Hanlon Shipbuilding and Drydock Company. The Pacific Derrick and Hoist Company has just issued a pamphlet describing its handling equipment which will be furnished anyone interested in handling problems.

THE SUBMARINE ISSUE

The following letter which was written to the editor of the Liverpool Journal of Commerce should prove of interest to the readers of the Pacific Marine Review as the "Mother" freight ship referred to in the communication was fully described and illustrated in the August, 1917, issue of the Pacific Marine Review and the early submarine experiments (also referred to) of the writer of the letter were described in the November, 1916, issue of this magazine.

Mr. Waddington's letter to the "Journal of Commerce" is as follows:

Sir: Under this heading in "The Journal of Commerce" of August 30th a description is given of a proposed "Mother" ship for aeroplanes, the deck of which is to be clear of all houses, bridges, masts, funnels, or other obstructions.

Doubtless in moderate weather the aeroplanes carried on board would have no great trouble in taking their departure from the deck of the vessel—returning would be a more hazardous feat. But the effectiveness of an aeroplane to sink a submarine by dropping a bomb on it is very uncertain, though it has been reported to have been done, it is almost impossible to drop a bomb on a vessel of narrow beam like a submarine, and I think that aeroplanes could be used to better advantage in attacking the German submarine bases.

Again, how long would we have to wait for the proposed mother ships to be built? We have no time to wait. We are waiting for the American fleet of wooden steamers to "bridge" the Atlantic. This idea is now being changed in favor of a fleet of fast (15 knot) steel steamers, so as to be able to run away from submarines when on the surface. We are also waiting for a proposed fleet of 10,000 ton freight submarines, 100 of which were to be built the first year, and 500 the second year.

Some put their faith in merchant fleets convoyed by destroyers, the latter being handy to pick up the crews

VEHISOTE **HOMASOTE**

Vehisote is the modern material, supplanting veneers or laminated wood for Panels, Partitions, Ceilings, etc., on high-class passenger vessels.

Vehisote has entered into the construction of nearly all of the fine ships built on the Atlantic Coast in the past few years.

Vehisote could be used to great advantage on the vessels now under construction in your yards.

HOMOGENEOUS
REGISTERED U.S. PATENT OFFICE
WATERPROOF
VEHISOTE
THE MATERIAL FOR WHICH
YOU HAVE LONG BEEN
WAITING
NO LAMINATIONS OR LAYERS
GUARANTEED NOT TO CHECK OR SPLIT

Homasote is similar to Vehisote but not as dense and of slightly less tensile strength.

It is intended for sheathing and bulkheads on cargo boats where a high finish and appearance are not essential.

Vehisote and Homasote are produced by the PANTASOTE COMPANY, a fact in itself assuring quality and large production which insures low cost to the user.

Such large shipbuilders as Wm. Cramp & Sons and the Newport News Shipbuilding and Dry Dock Company use these materials extensively.

Samples mailed and prices quoted upon application.

Scovel Iron Store Company

SAN FRANCISCO

of the convoyed vessels when sunk by unseen submarines—just as the merchant freight submarine would be liable to be sunk, because they would have to make 95 per cent of the voyage on the surface. I maintain that speed is no safeguard to a vessel from being torpedoed by a submarine lying in wait with only the periscope awash. And now it is reported that the Germans are fitting mirrors around the periscopes to make them still more invisible. Arming merchant steamers with adequate guns and gun crews is the best solution to the submarine menace when the submarine is on the surface (always assuming that the submarine is outclassed by the guns of the merchant vessel).

But the real menace today is from the unseen submarine, lurking hidden below the surface of the sea, watching its prey approach in the dim dawn or twilight through its mirrored periscope, which cannot be discerned by the lookouts of the merchant vessel or war craft. Against this danger there is only one protection, and that is by the use of "torpedo screens" towed alongside the vessel, but at a safe distance, so that when an attacking torpedo is intercepted and exploded by striking the screen the vessel remains uninjured, only the screen being destroyed. As far back as last February I advocated this method of protection to the Allied navies. The chief objection to their use is that the drag of towing the screens would reduce the speed of the vessel protected. I quite admit that my type of screens (and it is possible that someone else may invent a better type) would reduce the speed 1½ to 2 knots (as calculated), which would lengthen the voyage across the Atlantic one or two days, but better incur this delay and have the reasonable assurance that the vessel, cargo and crew will reach their destination.

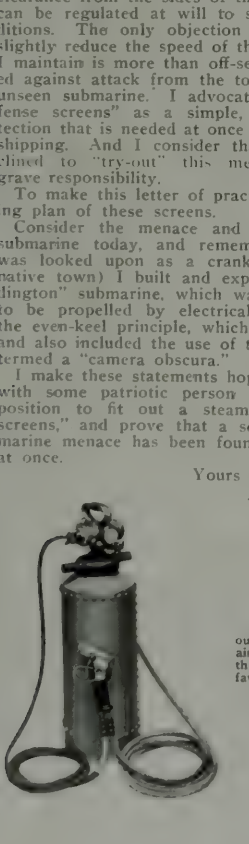
The cost of the screens (chiefly made of wood) is inconsiderable, their construction being very simple, so that any carpenter's shop could turn out a set in a few days, the well-known principle of the "otter" trawl boards being adopted to give the screens the desired clearance from the sides of the steamer, which clearance can be regulated at will to suit weather or other conditions. The only objection to their use is that they slightly reduce the speed of the protected steamer, which I maintain is more than off-set by the protection afforded against attack from the torpedo discharged from the unseen submarine. I advocate the use of "torpedo defense screens" as a simple, cheap, and effective protection that is needed at once for the preservation of our shipping. And I consider that the authorities who declined to "try-out" this method of protection incur grave responsibility.

To make this letter of practical use I enclose a working plan of these screens.

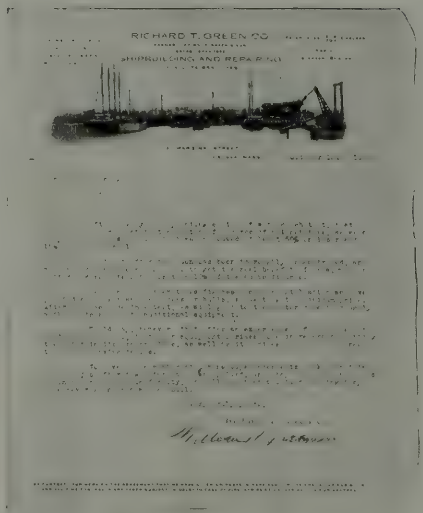
Consider the menace and destructive power of the submarine today, and remember that 30 years ago I was looked upon as a crank, when at Liverpool (my native town) I built and experimented with the "Waddington" submarine, which was the first of these crafts to be propelled by electrical power, and to work on the even-keel principle, which I set forth in my patent, and also included the use of the periscope, which I then termed a "camera obscura."

I make these statements hoping they will carry weight with some patriotic person or company who is in a position to fit out a steamer with "torpedo defence screens," and prove that a solution of the hidden submarine menace has been found, and which can be used at once.

Yours etc.,
J. F. WADDINGTON.



A Spray Engineering Company's outfit for painting with compressed air. The extreme simplicity of this apparatus has gained it great favor among shipyards.



RICHARD T. GREEN CO

SHIPBUILDING AND REPAIRING

PAINTING WITH COMPRESSED AIR

The most modern method of applying paint or other surface coatings is by means of compressed air. This method is rapidly superceding the old hand-brush practice, and this change is being brought about not only through the saving in labor, but also on account of the excellent results secured with paint-spraying devices.

In order to meet the heavy demand for a rugged, efficient device, the Sspray Engineering Company, of 93 Federal Street, Boston, Mass., has developed the Sprayco Pneumatic Painting Equipment, a compact portable unit suitable for either shop or field work. This apparatus is furnished ready for immediate use with the exception of attaching the air hose and coupling up to a compressed-air supply. All adjustments on the instrument are made by hand, no tools being required.

Where compressed air is not available, the Spray Engineering Company is prepared to furnish complete gasoline engine or motor-driven air-compressors.

Some of the advantages claimed for the use of this apparatus are as follows: That one unskilled man can do the work of from three to twelve skilled men using hand brushes; that finely finished surfaces free from streaks or brush marks are produced; that surfaces practically inaccessible to the hand brush are easily reached; that the paint-gun is simple in design and capable of withstanding rough usage, and that it can be blown free of paint and cleaned without dismantling; that the gun can be attached to an extension pole and used for painting surfaces out of the reach of the operator; that merely through the use of interchangeable nose-pieces any class of liquid coating can be manipulated; that the lightness or heaviness of the coating can be judged to a nicety; that there is no possibility of dirt becoming mixed with the paint, and finally that the air-tight container prevents the formation of paint skins.

The complete Form "P" Portable Equipment illustrated is recommended for all general purposes. This consists of the Model 4 Paint Gun, one pressure-control head mounted on a 3 or 5-gallon material container, one 12-ft. length of flexible metal-lined material hose, and one 12-ft. length of heavy rubber air hose with necessary couplings. The material and air strainers, which are embodied in this equipment, prevent foreign matter from clogging the gun.

Where large, flat surfaces are encountered, and, consequently, a fishtail spray could be used to advantage, the Form "P-1" Portable Equipment is recommended. This is identical to the Form "P" Equipment, except that

America's annual coal bill is nearly two billion dollars, and every one per cent. saved means $20,000,000 annually. Efficient insulation will save a higher percentage—for you and for the nation.

—more horsepower from America's Coal Pile

is one of the big problems of industry that touches us all. The economy with which coal is burned is as important in regulating the price of life's necessities as the cost of raw material or the price of labor.

"More power per pound of coal" is the aim of every manufacturer as he strives for industrial economy. "More heat per ton of coal" is the aim of every fuel user, whether in home, church, school or workshop.

One of the most important developments of Johns-Manville Asbestos has been in the saving of heat through Insulation. Johns-Manville have developed materials, built on asbestos as a base, that retard the flow of heat from boilers, furnaces, pipes and flues. The perfection of these heat insulations and their application to thousands of America's power plants are saving power by saving fuel—millions of dollars worth annually; nor does this include countless other installations on the heating systems of homes and buildings generally, where coal is burned for human comfort.

Twenty-five years' specialization, directed by the highest engineering talent, has enabled Johns-Manville to develop and produce insulations of exceptional efficiency and durability under every service condition.

Asbesto-Sponge Pipe and Boiler Insulation, for example—a remarkable felt which combines the "dead-air-cell" insulation of sponge with the endurance of asbestos is the most efficient pipe and boiler insulation known. Or 85% Magnesia—or Asbestocel, Zero, Anti-Sweat, or Standard Brine and Ammonia Insulations—whatever your needs, you can meet them *efficiently* with a Johns-Manville Insulation.

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COVERS THE CONTINENT

H. W. JOHNS-MANVILLE CO.
NEW YORK CITY
10 Factories - Branches in 54 Large Cities

JOHNS-MANVILLE
Service to fuel users

OUR ANNIVERSARY

⁂

On January 1st will appear the Fifteenth Anniversary Number of the Pacific Marine Review.

⁂

We plan to make our Anniversary Number the most valuable and at the same time the handsomest marine magazine ever published in America.

⁂

This will give our January issue a twofold advertising value. Aside from the drawing power that the Pacific Marine Review has built up through the character of its circulation and its persistent stand for the best interests of the American shipbuilder and the American shipowner, the January edition will possess the permanent advertising value of a book that is preserved both as a reference volume on account of its value and as a souvenir because of its beauty.

Write Us Now for Reservations

Interior and exterior views of the plant of the Marine Pipe & Machine Works at Seattle. The splendid new shop of this concern has been specially designed and is often referred to as the "sunshine shop of the Pacific" owing to the splendid lighting effect secured.

the Model 5 Paint Gun is furnished, which produces either a conical or fishtail spray.

The Extension Pole Attachment either eliminates or greatly reduces the amount of staging, scaffolding, or ladders, which would otherwise be required. The operator's range is increased by 8 ft. or more. This attachment can be used to great advantage for painting hulls of ships, tanks, etc.

The Model 4 and Model 5 guns are similar except that the latter is equipped with a removable spreader attachment for producing a fishtail spray. Both of these guns are made in one size only, and, by means of interchangeable caps and nose pieces, are capable of handling all classes of liquid coatings.

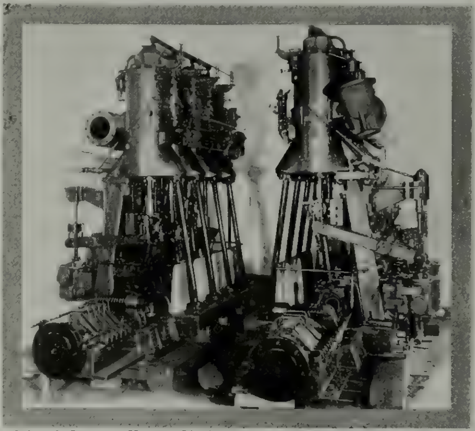
Only two gun adjustments are necessary. The round cap at the nose, which screws off and on, regulates the amount of paint, and the needle valve stem at the rear, which screws out and in, regulates the air supply. One setting of these adjustments is sufficient for any class of work. The control trigger acts simultaneously on both air and paint valves.

The pressure control head is mounted directly on the paint container and includes all parts necessary for maintaining the proper pressure on the material and air supplied to the gun. The paint gun thus may be used without regard to the positions of the paint container. Paint is forced to any required height above the level of the container, by regulation of air pressure through the reducing valve on the control head. The air strainer insures a clean air supply. The control head is so designed that the paint tank may be refilled without shutting off the main air supply. Gauges are furnished to show the air pressure on gun and material tank, so that proper adjustments may be made to insure maintaining the best conditions for all classes of work.

THE MARINE PIPE AND MACHINE WORKS

This concern started in a small way in 1906 at the corner of Railroad Avenue South and King Street, Seattle, under the name of the Seattle Marine Pipe Shop, and engaged in steamfitting, large pipe cutting and threading.

Three years later, owing to increased business, the firm moved to 579 Railroad Avenue South, adding more machinery and tools and entering into the general machine repair work. At the same time the company was incorporated under the name of Marine Pipe and Machine Works, and enjoyed a lucrative business from the start.



Pair of Sumner Heavy Oil Engines constructed at the plant of the Marine Pipe & Machine Works. In addition to a number of these engines, this shop is building large reciprocating engines and has on order a large amount of marine work of every description.

In the spring of the present year, owing to the rush of new work, they were compelled to seek still larger

IRON BARS GALVANIZED SHIP SPIKES
HEAVY HARDWARE
Large Flat Strapping
½ x 4"
¾ x 8"
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SCMCo
SCHAPER CONSTRUCTION MATERIAL CO.
90 WEST STREET
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MURRY JACOBS,
ARCADE BLDG.
PORTLAND OFFICE:
JACOBS & GILE,
RAILWAY EXCHANGE BLDG.

GAS IN HER BILGE

All Naval Authorities Agree is Dangerous
Can Be Avoided by Using Only

Irving-Subway GRATING INSTEAD OF **Plates**

For FLOORS of FIREROOMS in OIL BURNERS

IRVING-SUBWAY allows Forced Draft to Expel the Gas
IRVING-SUBWAY is Easier to Stand Watch on Than Plates
IRVING-SUBWAY is About Two-thirds Lighter Than Plates
IRVING-SUBWAY is Absolutely Non-Slipping
IRVING-SUBWAY is 80% Open

FLOORS —— WALKWAYS —— GALLERIES —— PLATFORMS —— STAIRTREADS

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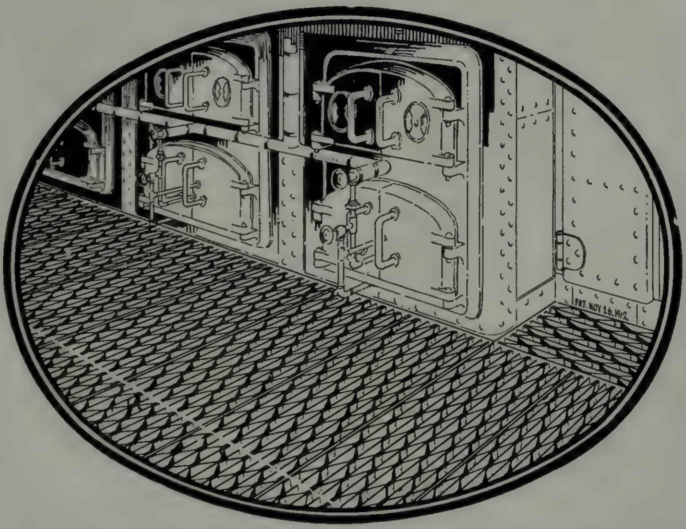
IRVING IRON WORKS CO.
Long Island City, N. Y.



IRVING SUBWAY GRATING
TRADE MARK
Patented Nov. 26, 1912

quarters, so purchased a tract of land, 160 by 180 feet in size, at the corner of West Spokane Street and East Marginal Way, and proceeded to erect thereon a building 100 by 150 feet in dimensions. This building is a model in construction. The designer, Mr. J. F. Swanberg, Manager of the firm, realizing the advantage of efficient lighting in shop work, spared no expense in his design, and the result has been a wonderfully lighted shop that well deserves the phrase that is often applied to it—"the sunlight shop of the Pacific Coast."

In planning the building, Mr. Swanberg provided for a spur track running into the rear of the structure, where a 20-ton overhead crane, which traverses the entire length of the shops, is utilized for loading and unloading freight. Some time ago the firm entered into the manufacture of the H. W. Sumner Company Marine Heavy Oil Engines, and an erecting stand has been provided at the rear of the plant with ample provision for the erection of six Sumner engine units at one time.

Among the special equipment secured for the new shop is a horizontal boring mill, 60 by 60 by 30 inches, with 4-inch spindle and platum 6 feet by 12 feet. A 52-inch Pittsburg Compound Gear Heavy Duty Lathe, a 27-inch La Blonde lathe, two 20-inch American lathes, one 16-inch American lathe, and one crank-pin turning machine, the latter an invention of Mr. L. D. Crossett, the Superintendent of the works. A Northern 20-ton electric crane has also been installed.

This firm has several large engine contracts on hand, including three sets of H. W. Sumner Company Marine Heavy Oil Engines, in units of 350 horsepower, building for the Olympia Shipbuilding Company. One set of the same size and type of engine for the Grays Harbor Motorship Corporation, and two 1200-horsepower triple-expansion marine engines with cylinders 18, 28 and 48 inches in diameter by 30 inches stroke, to run at 120 revolutions, with a steam pressure of 200 pounds at the high-pressure receiver. They also have on hand the condensers, thrust block and shaft, line shaft and spring bearings, stuffing boxes and propellers, and two Scott Patent Water Tube Boilers of 4000 square feet heating surface to be installed in two wooden vessels building at the plant of the Anderson Shipbuilding Corporation, Houghton, Lake Washington. The firm has been working night and day, employing three shifts for the past three months, and employs steadily about 150 men. Their fine new building is heated by a hot-water system which is supplied from the boiler-house and blacksmith shop adjoining.

The officers of the company are: J. F. Swanberg, President and Manager; James Campbell, Vice-President; W. H. Beatty, Secretary; C. F. Swanberg, Treasurer; L. D. Crossett, Superintendent; James A. Mitchell, Purchasing Agent; E. A. Lamb, Accountant, and John A. Maitland, Auditor.

THE DOUD-MacFARLANE MACHINERY COMPANY

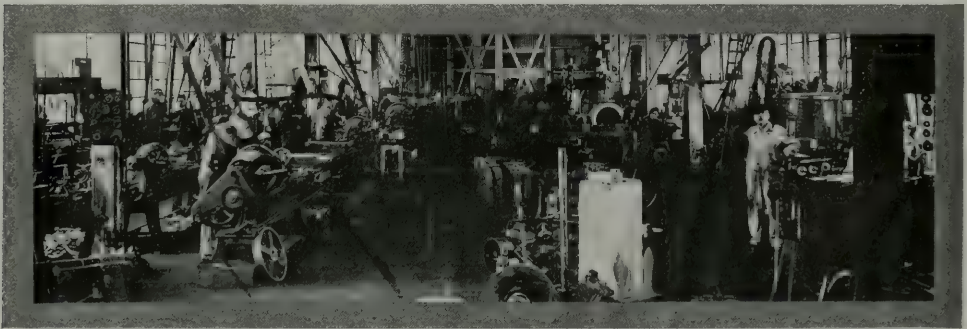
The accompanying photograph shows a small section of the machine shop of the electric and marine supply works of the Doud-MacFarlane Machinery Company of Tacoma, Washington. The main machine shop, which takes care of all the marine work, is 160 feet long by 85 feet wide. There is also a large galvanizing plant housed in a building adjoining the shop, while the manufacturing plant is entirely separate and occupies two floors of a third building. The galvanizing plant, where both the hot and the electric process are used, is extremely busy at the present time, always having a considerable amount of work on hand waiting its turn. There is a complete blacksmith shop in connection with the main shop which forges anchor stocks and all other forgings required for the firm's ship work.

A Doud-MacFarlane air port fitted with storm cover. This equipment has been approved by the Shipping Board.

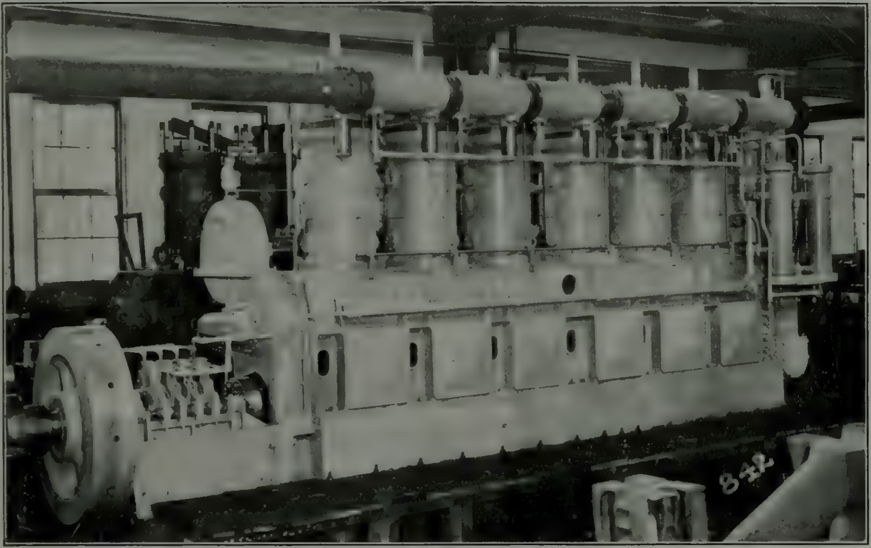
Up to a short while ago the Doud-MacFarlane Machinery Company conducted a large ship chandlery store in connection with its manufacturing plant, but it recently closed a deal whereby it disposed of its entire stock, and it is now devoting all its energies to the manufacture of ship work and fittings.

The line of port and fixed lights manufactured by this firm have been accepted for use in the wooden ships building for the United States Emergency Fleet Corporation, and it is also making mushroom ventilators, manhole plates, chocks, bitts, cleats, hawser pipes, etc., for many of these crafts building at Northwest yards.

In connection with the trade which they have built up in the regular ship chandlery line, Doud-MacFarlane are manufacturing and are prepared to promptly fill orders for galvanized iron steering wheels from 12 to 36 inches in diameter; port lights, round or hexagon style, in all sizes, of either galvanized iron or brass; galvanized straight or stern chocks and galvanized bow chocks in all sizes; galvanized boat cleats and galvanized heavy ship cleats in all sizes; heart-shaped thimbles; galvanized stockless anchors in all sizes; babbitt pattern anchors; galvanized water deck irons in all sizes; galvanized iron belaying pins in all sizes; galvanized eye chain plates in all sizes, and an assortment of different sized sheaves.


A corner in the Tacoma machine shop of the Doud-McFarlane Machinery Company. A great amount of marine hardware and fittings are being turned out here.

HEAVY DUTY DIESEL TYPE MARINE ENGINES



500 B.H.P. DIESEL TYPE REVERSIBLE MARINE ENGINE

These MARINE ENGINES are the result of EIGHTEEN YEARS stationary and marine DIESEL ENGINE EXPERIENCE and THIRTY YEARS EXPERIENCE in building the LARGEST AND HIGHEST CLASS OF STEAM ENGINES.

These engines are built in the LARGEST and most COMPLETELY EQUIPPED PLANT in this country, which is devoted EXCLUSIVELY to the building of Diesel Type Oil engines.

SHIPOWNERS AND SHIPBUILDERS should avail themselves of these facilities because:—

Full Diesel type motor ships CAN CARRY MORE CARGO for a given displacement than a steam ship; as the space required for the Diesel type oil engine and fuel is much less than that required by steam engines, condensers, boilers and the necessary coal bunkers.

On account of the extremely LOW FUEL CONSUMPTION (about one-third of a pound per I.H.P.) much LESS FUEL IS REQUIRED by a motor ship.

The oil fuel, which can be handled through pipes by a pump, CAN BE STORED in parts of the ship that are INACCESSIBLE FOR COAL and can be much MORE EASILY HANDLED.

Because of the extremely small fuel consumption FUEL enough CAN BE CARRIED for EXTREMELY LONG VOYAGES.

The elimination of the boilers and the handling of coal make a SMALL CREW possible, saving the space they require and their maintenance.

All of the above gives MOTOR SHIPS GREATER EARNING POWER.

SIZES AVAILABLE: 300, 500, 700, 1200 and 1350 B.H.P.

ALL SIX CYLINDER, ALL FOUR CYCLE, and all directly REVERSIBLE.

McINTOSH & SEYMOUR
CORPORATION
AUBURN, NEW YORK

THE SEATTLE BRASS COMPANY

The Seattle Brass Company, manufacturers of ship chandlery, are supplying the various shipyards on the Pacific Coast with air ports, fixed lights, bells and other fittings of their line of manufacture. This company, the largest exclusive brass founders in the West, were the first to anticipate the government's requirements in a special designed port light for both the Ferris and Hough types of wooden ship being built on this Coast. Samples of these fittings were submitted to and approved by the United States Government to be used on vessels being built under the supervision of the United States Shipping Board Emergency Fleet Corporation.

Contracts for ship fittings are booked for delivery as late as January, 1920, which would indicate a long rush period for the shipbuilding industry on the Pacific Coast. The Seattle Brass Company enjoys the confidence and patronage of some of the largest shipbuilding plants on the Pacific. They now have contracts booked for fifty-two steel hull vessels and forty-seven wooden ships under course of construction.

The Seattle Construction & Drydock Company, the Ames Shipbuilding Company, J. F. Duthie & Co., and the Columbia River Shipbuilding Corporation have let contracts for ship fittings for all the steel vessels they are building in addition to the cruisers, submarines and torpedoboat destroyers building for the Navy.

In the fittings required for wooden-hull vessels, this company is in a position to supply every brass fitting from the cast brass stanchions on the top of the wheel-house to the rudder braces and pintles on the stern post. The following wooden ship builders have placed contracts with this company for their entire requirements: The Grays Harbor Motorship Company, the Meacham & Babcock Shipbuilding Company, the Nilson & Kelez Shipbuilding Company, the Grant Smith-Porter-Guthrie Company, the McEachern Brothers Shipbuilding Company and the Seaborn Shipbuilding Company.

The Seattle Brass Company are making deliveries promptly and anticipate no delay in the future on account of the large volume of business, as they have taken the precaution to cover their requirements in both the metal and glass markets.

THE WOODEN JIG SAW

Every wooden ship builder is interested in the jig saw, and the photograph shown herewith is of a saw, having a 26-inch length of cut, which can easily handle 18-inch timbers at any angle. There is no better timber to be had for the construction of these saws than Oregon fir, which is, of course, only grown along the Northwest coast. The maker of these saws, the Pacific Derrick and Hoist Company, is urging that this type of machinery be purchased in the West, thus saving time and also shipping space which is so urgently needed for other commodities at this time. Information relative to these jig saws will be cheerfully furnished by the Pacific Derrick and Hoist Company of Seattle.

SHEPARD ELECTRIC CHANGES

William A. Battey, who has been connected with the Shepard Electric Crane & Hoist Co. since its start in this field, as Eastern Sales Manager, and Sales Director, will sever his active connection with the business on December 1st, but will retain his interest in the Company and continue as a Director.

Mr. Battey, who is Vice-President of the Pennsylvania Crusher Co., finds it necessary to devote his entire attention to its rapidly expanding business in the manufacture of hammer pulverizers, Bradford breakers and special crushing machinery for the by-product coke industry and other industries requiring reduction apparatus.

Mr. W. C. Briggs, who for ten years has been associated with Mr. Battey in the Shepard Company's New York office as Sales Engineer, will become District Manager.

On November 1st Mr. Robert T. Turner will join the New York organization as Sales Engineer and as additional salesman and service man will shortly be located in the company's new offices at 30 Church Street.

DIRIGO COMPASSES AND BINNACLES
manufactured complete at my shop are guaranteed to give satisfaction. Established 1907. Seven years at present location. I have many satisfied customers. Let me figure on your requirements. See exhibit at Manufacturers' Association, Seattle.

E. M. SHERMAN

Bellevue **Washington**

COME ACROSS—BUY A BOND

The United States has floated two Liberty Loans with marked success. The third load will doubtless be called for in the near future, and there is little doubt that the response to its appeal will be as whole-hearted and generous as it was to the first two calls on the country's spirit. The realization that we are at war is swiftly and surely, permeating the nation and cementing Americans of every race into the common bond of unity.

When the Government calls upon us for the third time, we would advise all our readers to obey the injunction set forth in the following verses, written expressly for the Pacific Marine Review by Mr. Chester Rosecrans, of San Francisco, a descendant of General Rosecrans of Civil War fame:

Come across, buy a bond!
Germany trembles at the sound—
They'll buy powder and shell,
Help send them to hell—
Come across, buy a bond!

Come across, buy a bond!
There's enough to go round.
Don't wait till tomorrow, get busy and buy,
And make the old kaiser heave a deep sigh—
Come across, buy a bond!

Come across, buy a bond!
America never was downed.
The murders at sea, the bloodshed in France
Must stop; our boys are there now taking a chance—
Come across, buy a bond!

Come across, buy a bond!
To ship our great army over the pond,
Let's all work together—united we stand
Till the Germans are whipped in their own fatherland—
Come across, buy a bond!

In many of the great shipyards

COLUMBIAN MANILA ROPE

is used in launching the huge ships.

Experience has taught these shipbuilders that COLUMBIAN can be depended upon to stand up under the trying conditions associated with this work.

Insure the success of *your* launchings by using COLUMBIAN.

COLUMBIAN ROPE COMPANY
Auburn, "The Cordage City" New York
Branches; New York—Chicago—Boston

WHAT IS THE OPERATING ENGINEER TO EXPECT FROM SUPERHEATING?

For the operating engineer, the man who has "to sleep with the job," the average marine engine, working with saturated steam, possesses no uncanny properties. What then will happen when his vessel is converted to superheated steam operation, or he is transferred to a vessel so designed and constructed? Is he to be called upon to be ship-mates with an engine that is possessed of peculiarities, in dealing with which, his former experience counts for but little? It may prove interesting to see just what he is going to experience.

In raising steam, an occasional opening of the drains on the superheated headers will be the only additional change in the usual procedure. With steam up on all boilers, the main stop valves are all opened and steam passes through the superheater pipes, going to the throttle at a temperature some 200° higher than when it left the main stop. On opening the throttle, the familiar "mushy" sound of the steam passing to the engine is missing, instead one hears the distinct hiss of absolutely dry steam, and as she gains headway and revolutions increase, this change becomes more noticeable.

It frequently happens that the engine that was formerly turning up 80 or 85 r.p.m.'s, is now turning up on an average of 82 to 87 r.p.m.'s, and whereas it was formerly necessary to open drains all around and at times impossible to close the L.P. drain for a considerable period, we find such procedure no longer necessary. It may be found necessary to speed up the circulating pump slightly to hold the surface condenser to its duty.

Perhaps the engineer has been accustomed to running with very snug rings and he is fearful lest these should "seize"; on the other hand, if he slacks up on them he feels that he may have leakage and lose in efficiency. This same engineer will put saturated steam pressure on a line that he has seen leaking slightly under water pressure well knowing that the line will prove tight under steam. In the same way a ring fit that would permit of steam leakage saturated, will be steam tight under superheated steam.

To compensate for the lubricating moisture under saturated steam, his vessel is now equipped with a force feed oil pump, introducing oil into the engine at the H.P. chest. This oil, which should be high grade superheater oil, is taken out by either a gravity or pressure filter, the cleaning of which calls for half an hour's attention, every thirty-six hours, in the case of some gravity device operating in conjunction with an engine developing 3000 I.H.P. Twenty minutes' attention to the pressure filter (installed between the pump and the feed water heater) every four or five days, will, in a similar manner, keep the boiler free from oil. This matter of oil in the feed is one that the average engineer views with suspicion, unless he is operating a jet condenser and the condensate is pumped overboard. The fact, however, that boilers can be kept entirely free from oil is not based on a few isolated installations, but upon the experience gained on something over 2000 vessels, manned by crews of all nationalities and in every form of service.

In the blowing of flues, the "Diamond" blower operates the same as with saturated steam, except that by using superheated steam in the operation, the flues are cleaned more satisfactorily and the accumulated soot is blown out as soot. When saturated steam is used for this purpose, the soot is often impregnated with moisture and the greater bulk of that escaping from the flues deposits, by gravity, in the soot pockets, thereby stopping up the lower rows of flues.

Furthermore, the superheater elements, while offering retardation to the draft, do not present a surface that is as potent in depositing soot, during the process of combustion, as is that presented by the average three or four turn retarder. Such being the case, there is less accumulation of soot in the same period, when the flues contain supeheater elements instead of retarders.

Suppose it becomes necessary to plug a flue, steam is shut off the superheater at the main stop or from that branch of the superheater on the affected portion of the boiler, the unit whose elements project into the disabled flue is withheld by unscrewing two nuts, dummy ends are inserted into the superheated and saturated headers, and the nuts again set up—altogether a ten or twelve minute operation.

By the use of packing suitable for high degree superheat, no trouble will be experienced with leakage or the scoring of the rods. It should be borne in mind, however, that as in saturated jobs the packing should be carefully put in and set up.

To the up-to-date engineer, considering the fuel saving affected, the slight additional care required by the superheated plant is, or should be, a negligible item. The elements essential to the successful operation of marine prime movers, by highly superheated steam, are all available at the present time, i.e. a proper design of superheater; material to withstand this high degree of superheat and a grade of oil that will not lose its lubricating properties at high temperatures.

WOOD SUBSTITUTES FOR SHIP INTERIORS

Shipbuilders and naval architects have always been on the lookout for some good material to replace wood for the interior finishes on both passenger liners and freight vessels. Such a material naturally must possess high qualities in many different directions. It must not have too great an expansion or contraction under changes of temperature, it must take and hold paints, shellacs, varnishes or oils, must not crack or wrinkle, and must be impervious to water and not swell or bulge when exposed to the action of water even for prolonged periods. In addition to all these qualities, the material must be as light or even lighter than wood, for, especially in passenger boats, the weight of deckhouses and the upper structure in general is of paramount importance.

The results of one of the most persistent efforts to meet all these varied requirements is found in "Vehisote" paneling as manufactured by the Pantasote Company, one of the oldest and most widely known manufacturing firms in the United States. The demand for Vehisote originally came from the Pullman Company, who desired a lining of the highest character for the inside of their sleeping cars. The success attendant upon the uses of this material in Pullmans naturally led to its adoption by automobile makers where its use has been specially favored in delivery bodies where large surfaces exist which must be absolutely watertight.

The virtues of Vehisote and a similar production made by the same firm and known as Homasote, the latter not having such a high surface finish as the former, soon secured the attention of the shipbuilder and steamship owner, with the result that today the use of the material in the marine field promises to outdo both of its main markets on land.

Such concerns as the New York Shipbuilding Corporation, William Cramp & Sons Ship and Engine Building Works, the Newport News Shipbuilding and Drydock Company, the Robins Drydock and Repair Company, the Morse Drydock and Repair Company, W. & A. Fletcher & Co., and many others, have found Vehisote satisfactory and have used it on some of their finest vessels.

This material lends itself readily to ceiling, stateroom partitions and bulkheads. Its resistance to moisture, its strength, ease and tightness of joining, its ability to take and hold paint, and the absence of cracking or peeling, the material being homogeneous and not laminated, have all contributed to its popularity with builder and owner. Furthermore, the large-size panels make possible results that cannot be obtained with wood without the ever-present danger of splitting or checking.

Some recent ships on which Vehisote has been used extensively are the "Great Northern," "Northern Pacific," the "Suwanee" and "Somerset" of the Merchants and Miners Line, the "Lenape" and the "Henry R. Mallory" of the Clyde Line, the "Madison" of the Old Dominion Steamship Co., two fine New York and Cuba Steamship Company's boats just finished at the Cramps yards, two Ocean Steamship Company's steamers now finishing at Harlan and Hollingsworth's Corporation, a new New York Central Railroad's ferry boat, the Lehigh Valley Railroad's ferry boat "Utica," New York's municipal ferry "Mayor Gaynor" and many other well known craft. Homasote is also finding favor as an interior sheathing in the living quarters of freighters and oil tankers.

These well known products of the Pantasote Company, Vehisote and Homasote, are handled on the Pacific Coast by the Scovel Iron Store Company of San Francisco.

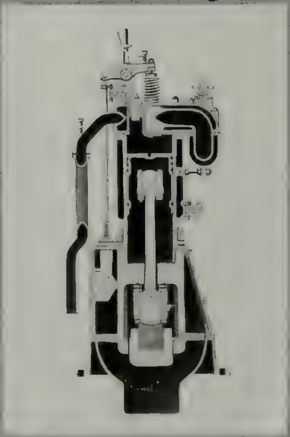
ACME ENGINES

THE MOST MODERN
HEAVY DUTY

ACME PERFECTION

DISTILLATE ENGINES
Standardized and Interchangeable Construction

SEPARATE CYLINDERS
SEPARATE CYLINDER HEADS
LONG CONNECTION RODS CAUSE LESS WEAR OF PISTONS AND CYLINDERS
WATER BY-PASSES FROM CYLINDER TO HEADS
TIGHTLY ENCLOSED BASE WITH LARGE REMOVABLE PLATES
BUILT BY A SKILLED MECHANICAL ORGANIZATION
SEPARATE EXHAUST MANIFOLD



PLASTIC BRONZE BEARINGS
OVERHEAD VALVES RESULTING IN LOWER FUEL COST AND GREATER POWER
MULTIPLE DISC SPUR GEAR TYPE FRICTION CLUTCH
PISTONS REMOVABLE THROUGH CRANK CASE OR ABOVE AS PREFERRED
SLOW RUNNING ARRANGEMENT
AN ECONOMICAL LUBRICATING SYSTEM

ACME ENGINE CO. OFFICE & WORKS FIRST & MINNA STREETS, SAN FRANCISCO

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SHIP-BUILDER
Designer and Builder of
Wooden Commercial Vessels
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PACIFIC COAST DEPARTMENT,
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QUALITY GUARANTEED
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ALL KINDS OF SHEET STEEL WORK AND REPAIRS
CITY IRON WORKS
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Van Arsdale-Harris Lumber Company
FIFTH AND BRANNAN STREETS
SAN FRANCISCO, CALIFORNIA
White Cedar, Spruce or Sugar Pine Template Lumber
Worked to Any Thickness Desired
Redwood Pattern Stock
In All Grades and Thicknesses
White Cedar
For Mould Loft Flooring
Long Clear Fir Timbers • Vertical Grain Fir Decking
Sugar Pine • California White Pine

BOOKS AND CATALOGUES

YEAR BOOK OF TYCOS ADVERTISING. This handsome catalog of a firm's yearly advertising covers a list of 170 publications of all kinds in which the Taylor Instrument Companies of Rochester, New York, advertised the diversified line of instruments which they manufacture. The book, besides being a valuable exposition of the uses, design and adaptability of Taylor instruments, is also a unique collection of up-to-date and up-to-the-minute advertising and should prove of interest to all users of thermometers, barometers, etc.

SAWS SAMMY SHOWME SAW is the title of the latest booklet issued by the Simonds Manufacturing Company of Fitchburg, Massachusetts. This handome brochure is illustrative and descriptive of the use of Simonds' saws in various industries throughout the country, and will be sent to anyone interested in metal-cutting saws on request to the Simonds Manufacturing Company.

THE COST CUTTER, BULLETIN No. 1. This booklet is issued by the Brown Portable Conveying Machinery Company of Chicago, New York, and Portland, Oregon. The catalog is well illustrated and describes, both pictorially and descriptively, a line of portable conveying and piling machinery adapted to the handling of package and sacked goods, on wharves, at stations, in warehouses, etc. This booklet is of special interest to warehousemen, wharfingers, shipowners, and terminal engineers, and will be furnished by the Brown Portable Conveying Machinery Company on request.

NAVIGATION, by Harold Jacoby, Rutherford Professor of Astronomy in Harvard University; 330 pages, numerous diagrams and tables. The Macmillan Company, New York, publishers; $2.25 net.

This volume is intended to contain everything necessary to the science of navigation, with the exception of the art as it applies to those waters near the polar regions, and at the same time keep down the size of the book as much as possible. Again, the author has not counted upon the supposition that his reader understands either higher mathematics or astronomy, and the book is exceedingly simple in its treatment of navigation problems. Briefly stated, the book has chapters on the fundamental problem of navigation, dead reckoning without logarithms, dead reckoning with logarithms, the compass, coastwise navigation, the sextant, the nautical almanac, older navigation methods, newer navigation methods and a navigator's day at sea. The tables in the appendix include: traverse table; conversion of longitude difference and departure; number logarithms; trigonometric logarithms; meridianal parts; sextant correction table; dip correction; conversions of hours and minutes into decimals of a day; conversion of degrees and minutes of longitude and hours and minutes of time; haversines; azimuth tables; auxiliary azimuth table; Kelvin's Sumner line table and Sumner intersection table.

WESTINGHOUSE ELECTRIC & MANUFACTURING CO. ANNOUNCES WAGE INCREASE

Another increase in wages for shop employees aggregating nearly $2,000,000 a year has just been announced by the Westinghouse Electric & Manufacturing Company. Effective October 16th, all employees observing shop hours, except munition workers, will receive an additional bonus of 10 per cent if they are on a salary or time-rate basis, and of 7 per cent if they are on a piece, premium or task basis.

The 20,000 shop employees of the Westinghouse Company form one of the most highly skilled organizations in the country. They are also one of the best paid bodies as well, increases granted since the outbreak of the European war now amounting to about 60 per cent of the former average compensation.

CUTTING METAL

For the man who is anxious to know more about metal-cutting saws there has just been issued by the Simonds Manufacturing Company, of Fitchburg, Mass., a very complete little booklet illustrating and describing various styles of solid and inserted tooth metal saws. This booklet, entitled "Methods of Cutting Metal," has sixty-four pages of important information on metal cutting, covering the uses of each saw, the sizes furnished, the teeth, speed and feed, and details which should be given when ordering them. If you are endeavoring to learn all you can about metal cutting, you will find practical information and up-to-date ideas in "Methods of Cutting Metal."

For Sale—FOUR NEW LAUNCHES, 45x11 feet with 50 H.P. STANDARD engine.
LAUNCH, 52x12 feet, with 65 H.P. STANDARD engine.
LAUNCH, 65x18 feet, with 11 H.P. STANDARD engine.
CAR-FLOAT BARGE, 272x50x15 feet, net tonnage 1374 tons.
FOUR WHALEBOATS, 30x6½ feet, very cheap.
CROWLEY LAUNCH & TUGBOAT COMPANY,
Howard St. Wharf, San Francisco, Cal.

EXPERIENCES WITH GLUE

L. W. Ferdinand & Company of 152 Kneeland street, Boston, Massachusetts, have been receiving many letters from users of one of their well known products, namely Jeffery's marine glue, and these letters serve to show that the supremacy of Jeffery's in the marine world is as strong as ever. The following sample letters will serve to illustrate how the yachting fraternity regard this well known product:

Gentlemen:

The No. 1 Extra Quality Jeffery's Marine Glue which has been used this spring on my 85-foot yacht, "Mahapa 11," for paying the seams of the new deck has proved very satisfactory and is in our opinion the best product for this purpose one the market. We have used Jeffery's marine glue on our other yachts both as a seam composition and for laying canvas dacks and it has always proved very durable and satisfactory.

Sincerely yours,
Harry A. Parsons, Commodore,
Cleveland Yacht Club.

Gentlemen:

Last spring I wanted to secure a perfectly smooth waterproof hull surface on my hydroplane "Baby Jinx" and decided to cover it with canvas in glue. I applied first a hot coat of No. 7 Soft Quality Jeffery's Marine Glue, then applied the canvas cut to shape and afterwards secured perfect contact by ironing it with an electric iron. I was surprosed and delighted at the smooth surface this gave. She was considerably faster and did not leak a drop.

J. C. Miller,
Miller Grate Co.,
Cleveland, Ohio.

STENOGRAPHERS IN DEMAND

The United States Government is in urgent need of thousands of typewriter operators and stenographers and typewriters. All who pass examinations for the departments and offices at Washington, D. C., are assured of certification for appointment. It is the manifest duty of citizens with this special knowledge to use it at this time where it will be of most value to the Government. Women especially are urged to undertake this office work. Those who have not the required training are urged to undergo instruction at once.

Examinations for the Departmental Service, for both men and women, are held every Tuesday, in 450 of the principal cities of the United States, and applications may be filed with the Commission at Washington, D. C., at any time.

The entrance salary ranges from $1,000 to $1,200 a year. Advancement of capable employees to higher salaries is reasonably rapid.

Applicants must have reached their eighteenth birthday on the date of the examination.

For full information in regard to the scope and character of the examination and for application blanks address the U. S. Civil Service Commission, Washington, D. C., or the Secretary of the U. S. Civil Service Board of Examiners at Boston, Mass.; New York, N. Y.; Philadelphia, Pa.; Atlanta, Ga.; Cincinnati, Ohio; Chicago, Ill.; St. Paul, Minn.; St. Louis, Mo.; New Orleans, La.; Seattle, Wash.; San Francisco, Cal.; Honolulu, Hawaii; or San Juan, Porto Rico.

JOHN A. McILHENNY,
President, U. S. Civil Service Commission,
Washington, D. C.

EXAMINATION FOR ENROLLMENT IN THE CIVIL ENGINEER CORPS OF THE NAVAL RESERVE

An examination will be held at the Bureau of Yards and Docks, Navy Department, Washington, D. C., to establish a list of eligibles for enrollment in the Civil Engineer Corps of the United States Naval Reserve Force. This examination will close at noon of December 31, 1917.

To compete in this examination, it is only necessary for the candidate to address a letter to the Reserve Examining Board giving full information as to his education and experience with testimonials and references.

A descriptive circular giving detailed information of the requirements for this examination will be sent to interested parties upon request to the Chief of the Bureau of Yards and Docks, Navy Department, Washington, D. C.

Candidates recommended for enrollment will be authorized to appear before the nearest medical officer of the United States Navy for physical examination. Candidates found to be physically unfit will not be enrolled.

Candidate must be an American citizen and must be an engineer in active practice of the profession of civil, electrical or mechanical engineering or some business directly connected with these professions.

The age and experience requirements are, for Ensign, not less than 24 years of age, with not less than two years of active professional practice; for Lieutenant (junior grade), not less than 27 years of age, with not less than five years of active professional practice; for Lieutenant, not less than 30 years of age, with not less than seven years of active professional practice, during at least three years of which candidate must have had responsible charge of work as principal or assistant.

Those now in the United States Naval Reserve Force, civilians and anyone who is now in the Army, either volunteer or drafted, including those directed to appear before an Exemption Board, may make application, but those in the Army either volunteer or drafted, must obtain their discharge before they can be enrolled.

Enrollments are for a period of four years or during the existence of a war or national emergency. Except during a war or national emergency, officers are only given active duty at their own request and then for short periods.

Pay and allowances of officers amount to, approximately, as follows:

Ensign, $2100 per annum.
Lieutenant (junior grade), $2500 per annum.
Lieutenant, $3100 per annum.

There is an additional allowance of $150 per annum for uniforms.

ATTENTION!

OWNERS OF IDLE INDUSTRIAL AND MINING PLANTS

We pay cash for old plants of any size or description, also small railway lines for dismantling. Write at once.

United Commercial Co.

918 CROCKER BUILDING
SAN FRANCISCO

Through contracts awarded early in October, work has actually been begun on Portland's new municipal grain elevator, to be located at St. Johns. The grading is under way for the foundations, while dredging has been started from the main channel to the frontage of the site. In a short time another dredge will start digging the first slip, which will be 1200 feet long, 250 feet wide, and have a minimum depth of 30 feet. Other work will be awarded in rapid order, as it is planned to have the elevator ready by September, 1918.

In the quarterly survey of the entrance to the Columbia river it was shown the 40-foot channel has increased in width to 1200 feet. The dredge "Chinook" was kept in service until the last of October because she was prevented from operating much of the summer season on account of the unprecedented prevalence of fog.

One sale during October was that of the gasoline barge "Wakena," built here by the Clatskanie Transportation Company, in 1911, for the Columbia river run, which was purchased by the Border Line Transportation Co., of Seattle, for $30,000. She is 116.5 feet long, has a beam of 25.7 feet and depth of hold of 7.8 feet, being fitted with two Union gas-engines, each of 110 horsepower.

What are said to have been among the longest masts being turned out in the world today were four measuring 136 feet which were shipped from Portland for South Africa. They were turned out by Robert McIntosh, together with spars and booms, and were loaded aboard the barkentine "Koko Head," at Prescott, her destination being Cape Town. The sticks are to be stepped in a vessel being rehabilitated by British interests at the South African harbor.

PORTABLE PLANERS

FOR WOODEN SHIP CONSTRUCTION

No. 5 Planer, 6¼x24", for planking and for planing ship timbers.
No. 5 Sander, same size as No. 5 Planer.
No. 6 Planer, 6¼x42 inches, for straightening faces of timbers.
No. 4 Planer, 4½x33 inches, with saw attachment for cutting grooves.
No. 4 Sander, same size as No. 4 planer.

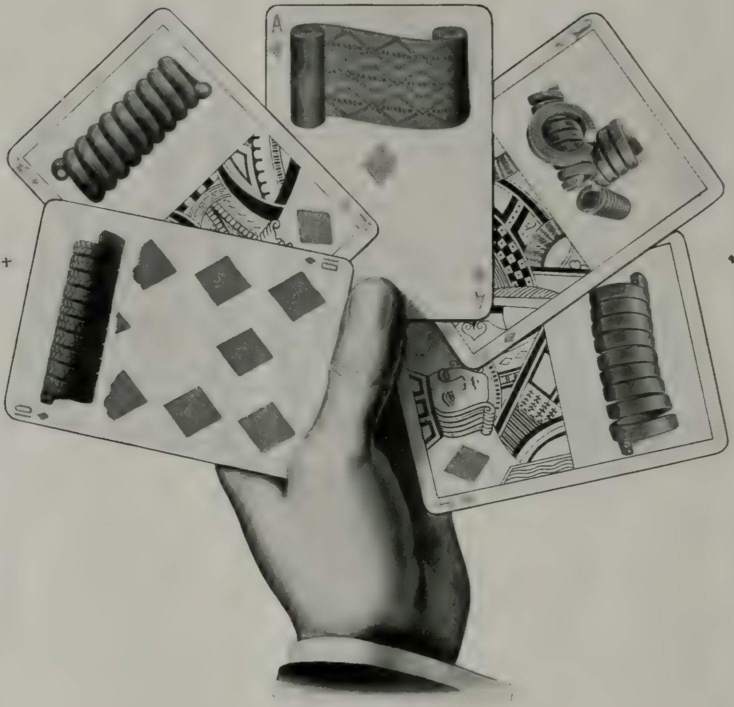
Equipped with Air Motors

These machines can be used to great advantage for dubbing and for work on keels, cants, knees, bilge stringers, etc. While only a few months on the market, these machines are being used all over the country and are paying for themselves many times over in the saving of time of expert men. Will give you the names on application of leading firms in all parts of the country who are using our planers with satisfactory results.

BABARE BROS. TACOMA, WASH. **Ship Builders and Machinists**

A ROYAL FLUSH

That Calls the Bluff on Imitations



EVERY PEERLESS PACKING IS BUILT UP TO A STANDARD, NOT DOWN TO A PRICE. THEY GIVE SERVICE.

IN THESE TIMES WHEN SHIPS ARE BEING FORCED TO THEIR LIMIT IT IS POLICY TO USE THE BEST PACKING YOU CAN BUY—IT MEANS SAVING OF POWER AND TIME.

FOR ECONOMY'S SAKE USE PEERLESS PACKINGS.

PEERLESS RUBBER MFG. CO.
NEW YORK

Branch Stores: Boston, Chicago, Minneapolis, Philadelphia
Stocks carried by good jobbers everywhere.

European Marine Notes

(Exclusive Correspondence of "Pacific Marine Review.")

London, October 1, 1917.

Submarine-Resisting Merchant Ships

A WELL-KNOWN shipowner here has been raising a question as to whether it would not be in the national interest to design merchant vessels of a type better able to resist submarine attacks than those at present being built. There is no question that, by greater subdivision, ships could be built which would be less liable to be sunk through submarine attack or mines. Such ships, however, would probably take longer to build, would require more steel, take longer to repair when damaged, carry less cargo, and need more labor and time for loading and discharging cargo. The problem of deciding on the most effective type of vessel to meet the tonnage requirements of the nation is therefore one for cool calculation, in which all the factors of production and all the risks to which the vessels will be subject must be taken into account. The supreme test to be applied is the estimated quantity of necessary commodities which could be imported into this country by the different types of ships within a given time—i.e., the time when such imports are most wanted. Regarded from this point of view, the means of transportation which can be estimated to give the greatest results is the one which the nation needs.

In the letter arising out of this discussion the example was given of a vessel, built according to certain plans, capable of carrying 10,000 tons of cargo, as compared with 13,000 tons which could be carried in a ship of similar dimensions but of the ordinary type. The carrying capacity of 100 ships of the latter type would thus be 1,300,000 tons, and of 100 ships of the former type, 1,000,000 tons. If, therefore, a supposititious example, one-fourth of the number of each type were put out of action for a certain period there would still, in the one case, remain 975,000 tons, as against 750,000 tons in the other case, thus showing a balance of 225,000 tons in favor of the ordinary ships. It must be remembered that the services of a ship which has been damaged may be as completely lost to the nation for a certain period as those of a vessel which has been sent to the bottom of the sea. After that period, however, the ship which has been only damaged is again available for service.

It is inconceivable that all the considerations have not been taken into account by the shipbuilding experts who have been advising the Government, and it seems to be a fair conclusion that the factors in favor of the simpler type have been held, in present conditions, to outweigh those on the side of other types. Nevertheless, even if that be so, the claims of the better-protected types of ship can never be lost sight of, and there might well be opportunities of laying down at any rate a certain number of such vessels for use as transports and merchant cruisers.

Unparalleled Freight Rates

The great and growing scarcity of tonnage which developed during the war period became a national problem of the first importance, to solve which a Controller of Shipping was appointed in January, 1917, with large powers to take over the control of the entire British fleet, as well as of all the shipyards producing merchant vessels. This shortage of shipping has been felt in every branch of the freight market and has been responsible not only for a rise in freights to wholly unprecedented figures but also for the introduction of limitation schemes designed to keep the country supplied with foodstuffs and raw materials, and France and Italy provided with coal — arrangements which, quite good in their way, have nevertheless failed to control neutral shipping, and have in effect resulted in two sets of freights, one, the lower, for British and Allied ships, and another, the higher, and much the higher, for vessels flying neutral flags. Neutrals, wherever possible, sought the extravagant open market rates ruling for non-limitation ports, and even when scheduled for the French ports, securing double the rates allowed to Allied vessels. The result is that market rates everywhere attained unparalleled figures. To take coal freights first, reference to the following tables will show that Alexandria, for example, has risen to $35 from Cardiff (South Wales), an advance of $33.28 on the lowest rate of 1914, and Genoa to $25, an advance of $23.50, but both are easily eclipsed by Barcelona, which has risen to $55, an advance of no less than $53.12, while Bilbao also shows a corresponding advance amounting to $30.03. Even the French ports, in spite of limitation rates, register advances (in the scheduled rates for neutrals) of 79 to 89 francs ($15.01 and $16.91) for the Bay, and of $10.75 to $11.00 for the Channel ports. From the Tyne the rates have been equally high, indeed often higher, Port Said, as an instance, reaching $50, Genoa $40, Barcelona $53.75, Bilbao $35, while for Scandinavian ports rates have risen to 200 kroner ($54.00) and over.

Italian Shipping Fusion

Particulars now received in this country show that the new Italian Steamship Company, the Transoceanica, which has been formed at Naples, represents a fusion of several of the leading Italian shipping companies and the largest shipping combination which has ever been formed in Italy. George Pierce, of the firm of Pierce Brothers, managers of the Sicula Americana Line, is to be president. The board also includes Brunelli and Bianzione Generale Italiana, and Senator Rossi Martini, a director of the Navigazione Generale Italiana. These directors are also on the board of the Lloyd Italiano, La Veloce, and Italia Steamship lines. William Pierce and Argurio, directors of the Sicula Americana, are also on the board. The manager of the new company is to be Mr. Ferrari, hitherto manager of the Italia Steamship Company.

The Navigazione Generale Italiana owns some eighteen fine steamers of between 3,000 tons and 22,000 tons gross, and maintains mail, passenger, and cargo services between Italy and North and South America. It was originally a combination of the old Florio and Rubattino lines. The Lloyd Italiano also trades to North and South America and owns some seven fine twin-screw steamers of between 5,000 and 9,000 tons gross. La Veloce, which also serves North and South America, owns several fine twin-screw steamers of somewhat similar size, and the Italia Company several steamers of between 4,000 and 9,000 gross. Besides trading to North and South America, it serves the West Indies. Several fine ships have been built in this country during recent years for the Sicula Americana. It seems likely that this strong combination will be an important factor in North Atlantic shipping after the war.

Iron and Concrete Ships

The first Norwegian iron and concrete ship was launched, according to a "Times" correspondent at Christiania, on August 20th at the Porsgrund Cement Works in the presence of the Prime Minister, M. Knudsen. The ship is built on an entirely new system, with the bottom upwards, in which extraordinary position the launching took place on a sort of underlying sledge, which glided out with the ship. When the water was reached the hull became detached from the sledge and gradually sank up to a certain point, then subsequently slowly righted itself. After this successful launching the inventor, M. Alfsen, a civil engineer, and manager of the Cement Works, was complimented by the Prime Minister, himself an old civil engineer, who pointed out the importance of the new invention, by which it is possible to build ships in a remarkably short time, thereby meeting the present urgent demand for increased tonnage. This particular ship, which is of 200 tons burden, was built in three weeks, but the next will only require about half that time, as the original frame will be used for each subsequent ship of the same size. The casting of the ship, when the frame is completed, will this time take only two days. It is intended to start the wholesale building of iron and concrete ships of 200, 500 and 1,000 tons. A 1,000-ton ship will be completed in six weeks.

Allied Shipping

A very important meeting is to be held in London at an early date, I understand, of representatives of the shipowning interests in all the principal Allied countries. On more than one occasion British and French, and more recently Italian, shipowners have met to consider questions affecting traffic, routes, and freight rates, with most satisfactory results; but it is quite comprehensible that the entry of the United States into the war, and the measures which have been concerted by Japan in association with Russia and America for the development of traffic in the Far East, may materially affect the situation. Hence the conference is bound to have consequences of considerable moment.

Standard Marine Engines

Now that standardization as applied to the hulls and other parts of merchant ships is proving a striking success it has been decided to extend the system to marine engines, boilers and auxiliary machinery. As a result of an important conference on the subject at the Institute of Naval Architects a committee, representative of all the technical societies as well as of Lloyd's Register, was appointed to carry out the scheme. Already, I am told, surprising progress has been made, and each engineering center is at work on different sections. Apart from immediate necessities, there is reason to believe that this development, as regards post-war trade, will be of very great advantage to this country in competition with other nations for the world's sea-carrying business. It also is expected to have a far-reaching effect on the British Board of Trade's attitude in regard to shipbuilding and engineering enterprises.

The Unsinkable Ship Problem

Naval architects are, I hear, somewhat puzzled about the semi-official announcement which was made the other day that the problem of building unsinkable ships has been "practically mastered." It is a fact that by providing, at the expense of cargo capacity, for greater buoyancy, which can be done in various ways, vessels can be made to remain afloat for a long time after being damaged. This would naturally give them a better chance of making port, but so far, I am told, there is no absolutely safe ship in course of construction, nor has one been designed. One of the latest proposals in this connection is that each of the decks should be made capable of carrying the ship even if the other decks are blocked. Most of the investigation now in progress is, I am informed, on the lines of the recommendations of the Bulkhead Committee, which was formed as a result of Lord Mersey's inquiry into the loss of the "Titanic."

S.S. "Kandahar" equipped with Scotch boilers and high degree Superheaters.

'THE MAN WHO WASTES COAL TODAY IS AN ENEMY OF MANKIND"

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15% of the coal used by ships can be saved by high superheat.

Bunker space saved in one ship would increase earnings $120,000 per year in transatlantic service.

Our Marine Engineers will furnish designs for your new or old ships.

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